

AD-787 300

PERSONNEL ARMOR

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**PERSONNEL ARMOR**

**A DDC BIBLIOGRAPHY**

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Alexandria, Va. 22314**

**OCTOBER 1974**

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AD787 300

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  This bibliography contains citations of 54 unclassified reports dealing with body armor of military personnel. Included are reports describing test methods and techniques for evaluating the technical performance and characteristics of body armor.		
Corporate Author-Monitoring Agency, Subject, Title, Personal Author, Contract, and Report Number Indexes are included.		

## F O R E W O R D

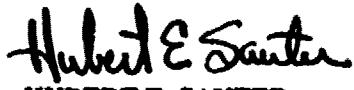
This bibliography, entitled *Personnel Armor*, contains 54 unclassified references. Bibliographic citations have been selected from documents processed into the Defense Documentation Center's data bank between January 1953 and May 1974.

The bibliography is arranged in ascending AD-number sequence.

Corporate Author-Monitoring Agency, Subject, Title, Personal Author, Contract, and Report Number Indexes are included.

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## C O N T E N T S

	<u>Page</u>
FOREWORD.....	iii
AD BIBLIOGRAPHIC REFERENCES.....	1
<b>INDEXES</b>	
CORPORATE AUTHOR-MONITORING AGENCY.....	O-1
SUBJECT.....	D-1
TITLE.....	T-1
PERSONAL AUTHOR.....	P-1
CONTRACT.....	C-1
REPORT NUMBER.....	R-1

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD- 21 004

QUARTERMASTER RESEARCH AND ENGINEERING COMMAND NATICK  
MASS

ENERGY COST OF WEARING ARMORED VESTS AND CARRYING  
PACK LOADS ON TREADMILL, LEVEL COURSE, AND MOUNTAIN  
SLOPES

(U)

MAY 53 11P WINSMANN, FRED R.; VANDERBIE, JAN H.;  
DANIELS, FARRINGTON JR.;  
REPT. NO. EPB-208

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. NO. 2 ON PHYSIOLOGY OF LOAD-  
CARRYING.

DESCRIPTORS: (•FATIGUE(PHYSIOLOGY), MEASUREMENT), (•BODY  
ARMOR, FATIGUE(PHYSIOLOGY)), MUSCULOSKELETAL SYSTEM,  
LOADS(FORCES), WEIGHT, MILITARY PERSONNEL, MOTION,  
TERRAIN, MOUNTAINS, ENERGY, CONTAINERS, FASTENINGS,  
METABOLISM, NYLON, LAMINATES

(U)

IDENTIFIERS: TREADMILLS, WALKING

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD- 29 020  
WATERTOWN ARSENAL LABS MASS

BALLISTIC EVALUATION OF ARMORED VESTS EMPLOYING  
NYLON, DORON, AND MANGANESE STEEL AS ARMOR VEST,  
ARMOR, T52-1 VEST, ARMORED, H1951 SPOONER VEST (U)

JAN 54 11P MASCIANICA,F.S.I.  
REPT. NO. WAL-710/1014  
PROJ: ORD-TB4-10

UNCLASSIFIED REPORT

DESCRIPTORS: BODY ARMOR, BALLISTICS, EFFECTIVENESS,  
MATERIALS (M)

IDENTIFIERS: M-10 MOTORS (M)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD- 29 480 6/21  
CHEMICAL CORPS MEDICAL LABS ARMY CHEMICAL CENTER MD

WOUND BALLISTICS, WOUNDED IN ACTION, KOREA, 6 AUGUST  
1953-19 AUGUST 1953 (U)

MAR 54 IV COE, GEORGE B.  
REPT. NO. RR257

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BALLISTICS, SOUTH KOREA), TACTICAL  
WARFARE, NORTH KOREA, WOUNDS AND INJURIES, BATTLES,  
WOUNDS AND INJURIES, CASUALTIES, SURGERY, (U)SURGERY (M)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAA14

AD- 35 448  
MARINE CORPS LANDING FORCE DEVELOPMENT CENTER QUANTICO  
VA

ARMORED VEST, MODIFIED, EX 53-1, STUDY, EVALUATION (U)  
AND FIELD TEST OF

FEB 54 IV  
REPT. NO. T 1041 1

UNCLASSIFIED REPORT

DESCRIPTORS: \*BODY ARMOR, EFFECTIVENESS, PROTECTIVE  
CLOTHING (M)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD- 37 068 19/4  
MARINE CORPS LANDING FORCE DEVELOPMENT CENTER QUANTICO  
VA

BODY ARMOR

(U)

JUL 54 IV  
REPT. NO. T 1041

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BODY ARMOR, TEST METHODS), TERMINAL  
BALLISTICS, PENETRATION, ARMOR PLATE, ACCEPTABILITY,  
MATERIALS, DESIGN (M)

UNCLASSIFIED

DUC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD- 39 470

CHEMICAL CORPS MEDICAL LABS ARMY CHEMICAL CENTER MD

A COMPARATIVE BALLISTIC STUDY OF THE STANDARD U.S.  
ARMY VEST, M1952-A, AND OF THE CANADIAN ARMOR VEST,  
X53 (U)

JUL 54 IV MAHEUX,R.C.; STEWART,GEORGE M.  
REPT. NO. RR300

UNCLASSIFIED REPORT

DESCRIPTORS: •BODY ARMOR, EFFECTIVENESS (M)  
IDENTIFIERS: M-1952 ARMORED VESTS (M)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD- 52 243  
AEROJET-GENERAL CORP AZUSA CALIF

DEVELOPMENT OF PLASTIC MATERIAL FOR PERSONNEL  
ARMOR

(U)

NOV 54 IV YOUNG,D.A.:  
CONTRACT: DA128 0170RDP1472

UNCLASSIFIED REPORT

DESCRIPTORS: \*BODY ARMOR, PLASTICS

(M)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD- 69 734  
AEROJET-GENERAL CORP AZUSA CALIF

DEVELOPMENT OF PLASTIC MATERIAL FOR PERSONNEL  
ARMOR

(U)

FEB 55 IV YOUNG,D.A.;  
CONTRACT: DAI28 0170RDP1472

UNCLASSIFIED REPORT

DESCRIPTORS: \*BODY ARMOR, \*PLASTICS, DESIGN, MATERIAL(M)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-255 237  
QUARTERMASTER CORPS WASHINGTON D C

A SET OF ANGLES OF OBLIQUITY FOR USE IN ASSESSING  
BODY ARMOR

(U)

FEB 61 IV MAISEL, HERBERT; CHANDLER, WALLACE;  
DECARLO, GERALD;

UNCLASSIFIED REPORT

DESCRIPTORS: \*BODY ARMOR, DISTRIBUTION, EFFECTIVENESS,  
PENETRATION

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-258 296

NAVAL MEDICAL FIELD RESEARCH LAB CAMP LEJEUNE N C

THE EFFECT OF SIMULATED TROPICAL CLIMATE ON THE  
PERFORMANCE OF MARINE CORPS PERSONNEL WEARING AN  
INTEGRATED BODY ARMOR-LOAD CARRYING SYSTEM (BALCS) (U)

MAY 61 IV MARTORANO,J.J.;COOK,E.B.;BLYTH,C.S.;

UNCLASSIFIED REPORT

DESCRIPTORS: \*BODY ARMOR, \*NAVAL PERSONNEL, \*STRESS  
(PHYSIOLOGY), CLIMATE, LOADING, MARINE CORPS, MILITARY  
PERSONNEL, PROTECTIVE CLOTHING, TESTS (U)

AN ATTEMPT WAS MADE TO DETERMINE TO WHAT EXTENT THE  
WEARING OF A BODY ARMOR-LOAD CARRYING SYSTEM  
(BALCS) AND THE CARRYING OF A TOTAL LOAD OF 54  
POUNDS WOULD AFFECT THE ABILITY OF A GROUP OF U. S.  
MARINES TO DO A FIXED AMOUNT OF WORK UNDER SIMULATED  
TROPICAL CLIMATIC CONDITIONS. ALTHOUGH THE ADDITION  
OF THE INTEGRATED BODY ARMOR-LOAD CARRYING SYSTEM  
(BALCS) PRODUCED SIGNIFICANT INCREASES IN THE  
SEVERAL PHYSIOLOGICAL PARAMETERS MEASURED, INCREASES  
WERE WITHIN NORMAL PHYSIOLOGICAL LIMITS FOR THE 45-  
MIN PERIOD IN WHICH THE SUBJECTS WERE EXPOSED TO THE  
EXPERIMENTAL CONDITIONS. ASSESSMENT OF THE ADRENAL  
CORTICAL ACTIVITY, AS INDICATED BY THE MEASUREMENTS  
UTILIZED IN THIS STUDY, SUGGESTED THAT NEITHER THE  
HEAT AND HUMIDITY IN WHICH THE SUBJECTS EXERCISED NOR  
THE WEARING OF THE BALCS WAS OF A SUFFICIENT  
MAGNITUDE TO CAUSE MEASURABLE STRESS.

(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-259 057  
MELLON INST PITTSBURGH PA

BALLISTIC PROTECTIVE BUOYANT MATERIALS

(U)

MAY 61 IV JASKOWSKI, M.C.;  
CONTRACT: N140 138 68879

UNCLASSIFIED REPORT

DESCRIPTORS: \*ARMOR, \*BODY ARMOR, \*DACRON, \*FIBERS  
(SYNTHETIC), \*ORLON, ANTI PERSONNEL AMMUNITION,  
BALLISTICS, COATINGS, EFFECTIVENESS, FIBERS,  
FRAGMENTATION AMMUNITION, GLASS TEXTILES, LAMINATES,  
METALLIC TEXTILES, MOISTUREPROOFING, PENETRATION,  
PLASTICS, PROJECTILES, PULSE HEIGHT ANALYZERS, STEEL,  
TERMINAL BALLISTICS, TEST EQUIPMENT, TEST METHODS (U)

UNBONDED STAPLE-FIBER BATTES WERE OBSERVED AS  
IMPEDING PROJECTILE PENETRATION BY CAUSING IT TO  
TUMBLE AS WELL AS INCREASING ITS EFFECTIVE SIZE BY  
WADDING. BATTES PREPARED FROM STEEL STAPLE FIBERS  
WERE INEFFECTIVE AS BALLISTIC ARMOR. HIGH-TENSILE  
WIRE SCREEN IN CONJUNCTION WITH AN ORLON STAPLE  
FIBER BATT INCREASES THE PROTECTIVE ABILITY OF THE  
BATT ONLY WHEN IT IS PLACED BEHIND THE FIBERS. THE  
BALLISTIC TEST METHOD WAS MODIFIED BY REPLACING THE  
AL WITNESS PLATE WITH A DEVICE CAPABLE OF  
ACCURATELY DETERMINING THE VELOCITIES OF THE  
PROJECTILES WHICH COMPLETELY PENETRATE THE ARMOR  
SAMPLES. USING THIS TECHNIQUE, DATA WERE OBTAINED  
AND PLOTTED FOR SAMPLES OF 1.0 DPF ORLON STAPLE  
FIBER BATTES, 1.5 DPF DACRON STAPLE FIBER BATTES AND  
DORON BODY ARMOR. (AUTHOR) (U)

11

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-262 076

QUARTERMASTER RESEARCH AND ENGINEERING COMMAND NATICK  
MASS

PHYSIOLOGICAL RESPONSE CHANGES OF MEN ATTRIBUTABLE TO  
BODY ARMOR, SUN, AND WORK IN A NATURAL DESERT  
ENVIRONMENT (INCLUDING NEGRO-WHITE DIFFERENCES) (U)

JUN 61 IV HANSON, HAROLD E.:

UNCLASSIFIED REPORT

DESCRIPTORS: \*BODY ARMOR, \*HEAT TOLERANCE, BODY  
TEMPERATURE, CLIMATE, CLOTHING, DESERT TESTS,  
EXERCISE(PHYSIOLOGY), HUMANS, PERSPIRATION,  
PHYSIOLOGY (U)

SWEAT PRODUCTION, RECTAL TEMPERATURE AND PULSE RATE  
WERE MEASURED OVER A 24-CONSECUTIVE-DAY PERIOD ON 16  
MEN (8 WHITE AND 8 NEGRO) IN BOTH A NATURAL AND A  
MODIFIED (SHADED) DESERT ENVIRONMENT. THESE  
INDICES WERE USED TO DETERMINE THE EFFECT OF WEARING  
BODY ARMOR, SUN, AND EXERCISE, AND TO COMPARE  
PHYSIOLOGICAL RESPONSES OF PAIRED NEGRO-WHITE  
SUBJECTS. WHEN AN INDIVIDUAL DONNED BODY ARMOR,  
AND EXERCISED IN A NATURAL HOT-DRY DESERT  
ENVIRONMENT, SIGNIFICANT INCREASES IN SWEAT  
PRODUCTION, RECTAL TEMPERATURE AND PULSE RATE  
OCCURRED. WHEN AN INDIVIDUAL WAS EXPOSED TO THE  
SUN, SIGNIFICANT INCREASES IN SWEAT PRODUCTION  
OCCURRED. WHEN AN INDIVIDUAL EXERCISED,  
SIGNIFICANT INCREASES IN SWEAT PRODUCTION, RECTAL  
TEMPERATURE AND PULSE RATE OCCURRED. HEAT  
TOLERANCE OF FULLY-CLOTHED NEGRO AND WHITE  
INDIVIDUALS WAS ABOUT EQUAL IN NATURAL HOT-DRY  
SURROUNDINGS. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAA14

AD-266 054  
MELLON INST PITTSBURGH PA

BALLISTIC PROTECTIVE BUOYANT MATERIALS

(U)

OCT 61 IV JASKOWSKI, M.C.  
CONTRACT: N140 138 68879

UNCLASSIFIED REPORT

DESCRIPTORS: \*BODY ARMOR, \*FIBERS (SYNTHETIC), \*NYLON,  
\*ORLON, ACRYLIC RESINS, CLEANING, CLEANING COMPOUNDS,  
DACRON, EFFECTIVENESS, FIBERS, FLOTATION, MATERIALS,  
PLASTICS, TERMINAL BALLISTICS, TEXTILES

(U)

13

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AD-269 577  
MELLON INST PITTSBURGH PA

BALLISTIC PROTECTIVE BUOYANT MATERIALS

(U)

JAN 62 IV JASKOWSKI, M.C.;  
CONTRACT: N140 138 68879

UNCLASSIFIED REPORT

DESCRIPTORS: •BODY ARMOR, •DACRON, •NYLON, •ORLON,  
•PROTECTIVE CLOTHING, ACRYLIC RESINS, CLEANING, FIBERS,  
FIBERS (SYNTHETIC), FLOTATION, FRAGMENTATION, MATERIALS,  
PENETRATION, PLASTICS, TERMINAL BALLISTICS, TESTS,  
TEXTILES

(U)

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AD-273 876

OFFICE OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING  
WASHINGTON D C

SYMPOSIUM ON PERSONNEL ARMOR HELD AT THE U. S. NAVAL  
RESEARCH LABORATORY OCTOBER 4-5, 1961 VOLUME I (U)

61 IV

UNCLASSIFIED REPORT

DESCRIPTORS: •BODY ARMOR, •SYMPOSIA, LAMINATES, PHYSICAL  
PROPERTIES, PROTECTIVE CLOTHING, SHOCK RESISTANCE,  
TEXTILES (U)

CONTENTS: CHARACTERIZATION OF TEXTILE YARNS FOR  
USE UNDER BALLISTIC IMPACT CONDITIONS DYNAMIC  
BEHAVIOR OF TEXTILE FIBERS AND STRUCTURES AS  
RELATED TO PERSONNEL ARMOR A THEORETICAL STUDY OF  
PENETRATION AND RESIDUAL PROJECTILE VELOCITIES  
METHOD FOR OBTAINING YIELD STRESSES AT HIGH  
STRAIN RATES THE DYNAMIC PROPERTIES OF HIGH  
TENACITY YARNS AND THEIR RELATIONSHIP TO BALLISTIC  
RESISTANCE BUOYANT INSULATING BODY ARMORS FROM  
STAPLE FIBERS SOME U. S. ARMY RESEARCH OFFICE  
SPONSORED RESEARCH DEVELOPMENT OF QMC  
COMPOSITE ARMOR VEST THE EFFECT OF RESIN  
CONCENTRATION ON PHYSICAL PROPERTIES OF A LAMINATED  
STRUCTURE FOR A CRASH AND BALLISTIC PROTECTIVE  
FLIGHT HELMET A SET OF ANGLES OF OBLIQUITY FOR USE  
IN ASSESSING BODY ARMOR (U)

15

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-276 256  
MELLON INST PITTSBURGH PA

BALLISTIC PROTECTIVE BOUYANT MATERIALS (U)

MAY 62 IV JASKOWSKI, MICHAEL C.  
CONTRACT: N140 138 68879

UNCLASSIFIED REPORT

DESCRIPTORS: \*BODY ARMOR, \*FIBERS (SYNTHETIC), ACRYLIC RESINS, BALLISTICS, DACRON, FIBERS, FRAGMENTATION AMMUNITION, MANUFACTURING, MATERIALS, PENETRATION, PLASTICS, TEXTILES (U)

BALLISTIC PROTECTIVE BUOYANT MATERIALS: EFFECT OF FIBER CRIMP ON PENETRATION BALLISTICS OF DACRON AND ACRILAN CARDED BATTs; CRIMPED FIBERS WERE SUPERIOR TO STRAIGHT OR UNCRIMPED FIBERS IN PREVENTING PASSAGE OF FRAGMENT SIMULATORS.

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UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-624 738 19/4 6/16  
NAVAL MEDICAL FIELD RESEARCH LAB CAMP LEJEUNE N C

THE EFFECTS OF TWO TYPES OF BODY ARMOR ON BODY  
TEMPERATURE. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,  
NOV 65 ZIP RASCH, PHILIP . . iWHITE, PAUL  
C. ,JR.; NORTON, ROBERT J. ;  
REPT. NO. VOL 15/NO. 24  
MONITOR: NAVMED , MF022-03-04-8001-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*BODY ARMOR, BODY TEMPERATURE), (\*BODY  
TEMPERATURE, BODY ARMOR), HEAT, PHYSIOLOGY,  
STRESS(PHYSIOLOGY), SURFACE TEMPERATURE (U)

THE PURPOSE OF THIS STUDY WAS TO DETERMINE WHETHER  
THERE IS A DIFFERENCE IN THE BODY HEAT BUILD-UP UNDER  
THE STANDARD MARINE CORPS UPPER TORSO BODY ARMOR  
VERSUS THE NMFRRL LIGHTWEIGHT PROTOTYPE BODY ARMOR.  
TWENTY YOUNG ADULT MARINES MADE TWO FORCED  
MARCHES OF 3 MI EACH, ONE WITH EACH OF THE ABOVE  
ARMORS. MEAN CHEST SKIN TEMPERATURE UNDER THE  
PROTOTYPE ARMOR WAS 2F. LESS THAN UNDER THE  
STANDARD ARMOR. NO DIFFERENCE WAS OBSERVED IN  
RECTAL, ARM, OR ABDOMINAL TEMPERATURES. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-658 034 6/17 19/4 5/5  
ARMY NATICK LABS MASS PIONEERING RESEARCH DIV

HUMAN FACTORS EVALUATION OF BODY-SUPPORTED  
AIRCRAFT CREWMAN'S BUTTOCKS AND CROTCH PROTECTIVE UNITS:  
(COMPARISONS OF TWO HEIGHTS OF CROTCH PROTECTOR AND  
THREE SUSPENSION SYSTEMS). (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
JAN 67 28P BURSE, RICHARD L. I  
REPT. NO. EPR-14  
PROJ: DA-1C024701A121  
TASK: 1C024701A12102  
MONITOR: USA-NLABS TR-68-4-PR

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BODY ARMOR, \*HUMAN FACTORS ENGINEERING),  
(\*AVIATION PERSONNEL, BODY ARMOR), DESIGN,  
ACCEPTABILITY, FLIGHT CLOTHING, ANTHROPOMETRY (U)

THE RESEARCH DESCRIBED WAS AN EVALUATION OF BODY-SUPPORTED AIRCREWMEN'S BUTTOCKS AND CROTCH PROTECTIVE UNITS IN WHICH TWO HEIGHTS OF CROTCH PROTECTOR AND THREE DIFFERENT SUSPENSION SYSTEMS WERE COMPARED WITH RESPECT TO FIT, COMFORT, EASE OF USE, ESTIMATED LENGTH OF TIME THE SYSTEM COULD BE USED AND THE ADEQUACY OF SEVERAL DIMENSIONS OF THE PROTECTIVE UNITS. IN GENERAL, BOTH TYPES OF PROTECTIVE UNITS AND ALL THREE SUSPENSION SYSTEMS WERE EquALLY SATISFACTORY. ONE TYPE OF SUSPENSION SYSTEM AND ONE HEIGHT OF CROTCH PROTECTOR WERE SIGNIFICANTLY EASIER TO USE, HOWEVER, WHILE BOTH CROTCH PROTECTORS WERE TOO WIDE. SUBJECTS DESIRED THAT THE LONGER CROTCH PROTECTOR BE SHORTENED AND THE SHORTER CROTCH PROTECTOR BE LENGTHENED TO APPROXIMATELY THE SAME LENGTH. THIS DESIRED CHANGE APPARENTLY WAS BASED ON FACTORS OTHER THAN PHYSICAL DISCOMFORT.

(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-672 504 19/4 6/5 1/2  
AVIATION SAFETY ENGINEERING AND RESEARCH PHOENIX ARIZ

CRASHWORTHINESS OF AIRCREW PROTECTIVE ARMOR. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
APR 68 132P HALEY, JOSEPH L., JR.;  
GATLIN, CLIFFORD I.; SCHAMADAN, JAMES L.;  
TURNBOW, JAMES W.;  
CONTRACT: DAAG17-67-C-0138  
PROJ: DA-1F141812D154  
MONITOR: USA-NLABS, C/OM

TR-68-57-CM, 47

UNCLASSIFIED REPORT

DESCRIPTORS: (\*CRASH INJURIES, FLIGHT CREWS), (\*BODY  
ARMOR, FLIGHT CREWS), AVIATION ACCIDENTS, IMPACT,

HELICOPTERS, DROP TESTS, SIMULATION, AIRCRAFT SEATS (U)  
IDENTIFIERS: CRASHWORTHINESS (U)

THE RESULTS OF A TEST PROGRAM CONDUCTED TO DETERMINE THE PHYSIOLOGICAL EFFECTS OF PERSONNEL ARMOR ON AIRCREW MEMBERS EXPOSED TO AN AIRCRAFT CRASH ENVIRONMENT ARE PRESENTED. EMPHASIS WAS PLACED ON THE EFFECTS OF ARMOR AS WORN BY AIR CREWS IN CURRENT MILITARY OPERATIONS. THE PROGRAM WAS DIVIDED INTO TWO MAJOR TASKS. THE FIRST INCLUDED A LITERATURE SEARCH TO OBTAIN DESIGN DATA ON HUMAN INJURY SIMULATION TECHNIQUES, A CONFERENCE TO OBTAIN INFORMATION FROM A GROUP OF COMBAT-EXPERIENCED US ARMY MEDICAL HELICOPTER CREWMEN ON THE IMPACT BEHAVIOR OF THE ARMOR IN OBSERVED ACCIDENTS, AND MODIFICATIONS TO ANTHROPOMORPHIC DUMMIES TO EFFECT RECORDINGS OF MECHANICAL 'INJURIES' TO VITAL BODY AREAS. THE SECOND TASK CONSISTED OF THREE TYPES OF DYNAMIC TESTS: VERTICAL DROP TOWER TESTS, HORIZONTAL ACCELERATOR TESTS, AND A FULL-SCALE HELICOPTER CRASH TEST. TEST RESULTS INDICATED THAT THE POTENTIALLY DANGEROUS EFFECTS OF THE ARMOR DURING A CRASH SITUATION ARE RELATIVELY FEW. THE MOST SERIOUS PROBLEM APPEARS TO BE THE POSSIBLE COLLAPSE OF THE TRACHEA FOLLOWING AN IMPACT OF THE UPPER EDGE OF THE ARMOR WITH THE FRONT OF THE NECK.  
(AUTHOR) (U)

UNCLASSIFIED

CDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-676 689 6/19 5/10 19/4  
NAVAL MEDICAL FIELD RESEARCH LAB CAMP LEJEUNE N C

BODY ARMOR IN A HOT HUMID ENVIRONMENT. PART I.  
STUDIES IN UNACCLIMATIZED MEN. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,  
SEP 68 19F YARGER, WILLIAM E.; CRONAU,  
LESLIE H., JR.; GOLDMAN, RALPH F.;  
REPT. NO. NMFRRL-VOL-XVIII/NO-16  
MONITOR: NAVMED MF12-524-007-8008-1

UNCLASSIFIED REPORT

DESCRIPTORS: (•BODY ARMOR, TROPICAL TESTS),  
PERFORMANCE(HUMAN), ACCLIMATIZATION, STRESS(PHYSIOLOGY),  
HEAT TOLERANCE, PERFORMANCE(HUMAN), MOTOR REACTIONS,  
PERSPIRATION, BODY TEMPERATURE, BODY WEIGHT (U)

THIS STUDY IN UNACCLIMATIZED INDIVIDUALS IS PART OF  
AN OVERALL PLAN OF INVESTIGATION DESIGNED TO GIVE TO  
THE FIELD COMMANDERS A REASONABLE METHOD OF  
PREDICTING HEAT CASUALTIES IN THEIR MEN, KNOWING  
CONDITIONS OF CLIMATE, LOAD, TERRAIN, AND THE  
PRESENCE OR ABSENCE OF BODY ARMOR. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 2AA14

AD-682 689 6/17 19/4 6/19  
NAVAL MEDICAL FIELD RESEARCH LAB CAMP LEJEUNE N C

BODY ARMOR IN A HOT HUMID ENVIRONMENT. PART II.  
STUDIES IN HEAT ACCLIMATIZED MEN.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,  
JAN 69 49P YARGER, WILLIAM E. SLITT, B.  
D. GOLDMAN, RALPH F. ;  
REPT. NO. NMFRRL-VOL-XIX/NO-1  
MONITOR: NAVMED MF12.524.007-8008-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO PART I, AD-676 689.

DESCRIPTORS: (•BODY ARMOR, TROPICAL TESTS),  
PERFORMANCE(HUMAN), ACCLIMATIZATION, STRESS(PHYSIOLOGY);  
HEAT TOLERANCE, BODY TEMPERATURE, PERSPIRATION, TROPICAL  
REGIONS, METABOLISM, STATISTICAL ANALYSIS (U)

THE STANDARD ISSUE MARINE CORPS PERSONNEL BODY  
ARMOR VEST (M1955) WAS TESTED FOR ITS EFFECT ON  
MEN WORKING UNDER HOT HUMID CONDITIONS APPROXIMATING  
THOSE SEEN IN SOUTHEAST ASIA. THIS VEST IS  
LARGELY IMPERVIOUS TO THE PASSAGE OF WATER VAPOR AND  
THEREBY IMPEDES EVAPORATIVE COOLING OVER THE CHEST.  
BODY ARMOR PRODUCES A PRONOUNCED EFFECT REFLECTED  
BY AN INCREASE IN RECTAL TEMPERATURE IN THE SUBJECTS  
WHEN THEY ARE WEARING THE ARMOR. THIS EFFECT IS  
RESTRICTED TO A RANGE OF ENVIRONMENT BRACKETED BY 32  
TO 88F WBGT (APPROXIMATELY). BELOW THIS  
LEVEL, HEAT LOSS FROM AREAS OTHER THAN THE CHEST IS  
SUFFICIENT TO DISSIPATE BODY HEAT EFFECTIVELY.  
ABOVE THIS RANGE, THE STRESS OF THE ENVIRONMENT IS  
SO GREAT AND THE EVAPORATION OF SWEAT IS SO  
INEFFICIENT THAT WEARING BODY ARMOR MAKES LITTLE  
DIFFERENCE. THE EFFECT OF WEARING ARMOR IN THIS  
RANGE (82-88F) IS EQUIVALENT TO A 5F INCREASE  
IN THE WBGT FOR UNARMORED MEN. THE EXPERIMENT  
WAS DESIGNED TO ELIMINATE THE WEIGHT OF THE ARMOR AS  
A SOURCE OF DIFFERENCE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-685 838 1/2 13/12 6/17  
DYNAMIC SCIENCE PHOENIX ARIZ AVSER FACILITY

A STUDY OF FORCES CAUSED BY HEAD IMPACT ON AIRCREW PERSONNEL ARMOR UNDER SIMULATED CRASH CONDITIONS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
NOV 68 108P GATLIN,CLIFFORD J. ;  
SCHAMADAN,JAMES L. ;BARRON,EDWARD R. ;  
TANENHOLTZ,STANLEY D. ;  
CONTRACT: DAAG17-67-C-0138  
PROJ: DA-1-F-141812-D-154  
MONITOR: USA-NLABS,C/PLSEL

TR-69-49-CE,59

UNCLASSIFIED REPORT

DESCRIPTORS: (•AVIATION ACCIDENTS, FORCE(MECHANICS)),  
(•HEAD(ANATOMY), IMPACT), (•BODY ARMOR, IMPACT TEST\$),  
HELMETS, TEST FACILITIES, SIMULATION, ANTHROPOMETRY,  
TRACHEA, FACE(ANATOMY), CRASH INJURIES, PROBABILITY,  
DECCELERATION, ARMY AIRCRAFT, FLIGHT CREWS (U)  
IDENTIFIERS: CRASH TESTS (U)

THE RESULTS OF A TEST PROGRAM CONDUCTED TO DETERMINE THE MAGNITUDE, DURATION AND SHAPE OF THE FORCE-TIME RELATIONSHIP RESULTING FROM HEAD IMPACT ON PERSONNEL ARMOR IN A CRASH SITUATION ARE PRESENTED. THE PROGRAM WAS DIVIDED INTO TWO MAJOR TASKS. THE FIRST INCLUDED MODIFICATION OF AN ARMOR FRONT TORSO PLATE TO CARRY THE TEST INSTRUMENTATION, MODIFICATION OF THE ANTHROPOMORPHIC DUMMY TO IMPROVE HUMAN SIMULATION, AND MODIFICATION OF THE UH-1B/D ARMORED CREW SEAT TO PREVENT FAILURE. THE SECOND TASK INVOLVED THE PERFORMANCE OF 12 DYNAMIC TESTS USING TWO DIFFERENT TYPES OF AIRCREW PERSONNEL ARMOR, BOTH WITH AND WITHOUT A PROTECTIVE HELMET. THE TEST RESULTS INDICATED THAT SIGNIFICANT HEAD/ARMOR IMPACT OCCURS MOST FREQUENTLY IN THE CHIN AREA. SUCH CONTACT PRODUCED IMPACT PULSES THAT WERE TRIANGULAR IN SHAPE WITH PEAK LOADS RANGING FROM 27 TO 500 POUNDS AND TIME DURATION RANGING FROM 0.025 TO 0.045 SECONDS. LOADS ON THE CHIN OF THIS MAGNITUDE AND DURATION WOULD NOT BE EXPECTED TO PRODUCE SERIOUS INJURY TO A HUMAN BEING. (AUTHOR) (U)

UNCLASSIFIED

DCC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-687 953 6/17  
AVIATION (M L) CO LTD (GT BRIT)

PHYSIOLOGICAL COSTS OF BODY ARMOR, (U)

69 8P GOLDMAN, RALPH F. :

UNCLASSIFIED REPORT  
AVAILABILITY: PUB. IN MILITARY MEDICINE, V134 N3  
P204-210 MAR 69.

DESCRIPTORS: (\*BODY ARMOR, PHYSIOLOGY), PERSPIRATION,  
BODY TEMPERATURE, SKIN(ANATOMY), HEAT TRANSFER,  
EVAPORATION, PERFORMANCE(HUMAN), MODEL TESTS,  
PERMEABILITY (U)

THE DISCUSSION TOUCHES ON THE HEAT PRODUCTION OF  
SOLDIERS CARRYING TYPICAL LOADS AND HOW THIS IS  
RELATED TO MAN'S ENERGY EXPENDITURE, EXPRESSED AS  
KILOCALORIES OF HEAT PRODUCTION PER HOUR PER POUND OF  
WEIGHT CARRIED. THE DISCUSSION FURTHER TOUCHES ON  
THE IMPERMEABILITY OF BODY ARMOR, ON SWEAT COOLING,  
ON THE HEAT LOSS AS A FUNCTION OF THE CLOTHING WORN  
AS EXPRESSED IN 'CLO' UNITS. DESCRIPTION OF MODEL  
TESTS IS ENCLOSED. FINALLY THE DISCUSSION TOUCHES  
VERY BRIEFLY ON THE EFFECTS OF PERFORATING  
IMPERMEABLE MATERIALS IN ORDER TO IMPROVE THEIR  
EVAPORATIVE TRANSFER CHARACTERISTICS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAA14

AD-688 122 19/4 5/9  
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT  
EQUIPMENT LAB

BODY ARMOR FOR AIRCREWMEN. (U)

DESCRIPTIVE NOTE: SUMMARY REPT. 1962-1967,  
JAN 69 31P BARRON,EDWARD R.;ALESI,  
ANTHONY L.;SPARK,ALICE F.;  
REPT. NO. C/ED-50  
PROJ: DA-1-F-164204-D-154  
MONITOR: USA-NLABS TR-69-43-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (\*FLIGHT CREWS, \*BGDY ARMOR), (\*AERIAL  
GUNNERY, PROTECTION); DESIGN, COMPOSITE MATERIALS, GLASS  
TEXTILES, CERAMIC MATERIALS, COMPATIBILITY (U)

BODY ARMOR WHICH PROTECTS ARMY AIRCREWS OF LOW-  
FLYING AIRCRAFT AGAINST 7.62 MM/CALIBER .30 AP  
SMALL ARMS GROUND FIRE HAS BEEN DEVELOPED BY THE U.  
S. ARMY NATICK LABORATORIES. THE ARMOR  
UTILIZES A RELATIVELY LIGHTWEIGHT COMPOSITE OF  
CERAMIC BONDED TO FIBERGLASS. THE U. S. ARMY  
NATICK LABORATORIES IMPROVED ON EARLIER CERAMIC  
COMPOSITE ARMOR MADE OF FLAT, MULTIPLE CERAMIC TILES  
BY DEVELOPING SEPARATE FRONT AND BACK ONE-PIECE  
COMPOSITE PANELS WHICH ARE CURVED TO FIT THE TORSO.  
A CLOTH CARRIER WITH LARGE FRONT AND BACK POCKETS  
WAS DESIGNED TO HOLD THE ARMOR PANELS; PERMITTING THE  
AIRMAN TO WEAR THE ARMOR COMFORTABLY AND WITHOUT  
INTERFERENCE WITH HIS OPERATIONS. EXPERIMENTAL  
ARMOR FOR LEG PROTECTION AGAINST SMALL ARMS WEAPONS  
HAS ALSO BEEN MADE OF THE CERAMIC COMPOSITE.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT PIRLOGRAPHY SEARCH CONTROL NO. /ZAAI4

AU-AVI 07: A.4 6-17 6.17 5.  
ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT  
PARIS (FRANCE)

PATTERN RECOGNITION. BODY ARMOUR AND AIRCREW  
EQUIPMENT ASSEMBLIES. CURRENT SPACE MEDICAL  
PROBLEMS. AEROMEDICAL EVACUATION.

(U)

DESCRIPTIVE NOTE: CONFERENCE PROCEEDINGS.

OCT 68 288P

REPT. NO. AGARD-CP-41

UNCLASSIFIED REPORT

DESCRIPTORS: (\*PATTERN RECOGNITION, SYMPOSIA), (\*BODY  
ARMOR, SYMPOSIA), (\*AEROSPACE MEDICINE, SYMPOSIA),  
(\*EVACUATION, SYMPOSIA), TARGET ACQUISITION, PROTECTIVE  
CLOTHING, CONTROLLED ATMOSPHERES, AIR TRANSPORTATION,  
FLASHBLINDNESS, LIFE SUPPORT, AIR FORCE OPERATIONS (U)

THE VOLUME CONTAINS THE TEXT OF 29 PAPERS PRESENTED  
AT THE 25TH MEETING OF THE AEROSPACE MEDICAL  
PANEL OF AGARD. THE PAPERS ARE GROUPED UNDER  
THE FOUR SUBJECT HEARINGS COVERED IN THE PROGRAM,  
NAMELY, PATTERN RECOGNITION, BODY ARMOUR AND AIRCREW  
EQUIPMENT ASSEMBLIES, CURRENT SPACE MEDICAL PROBLEMS  
AND AEROMEDICAL EVACUATION. IN ADDITION, THERE IS  
A TECHNICAL SUMMARY WHICH INCLUDES INFORMATION  
DERIVED FROM THE DISCUSSIONS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-641 739 19/4  
IIT RESEARCH INST CHICAGO ILL

CONSTRUCTION OF BALLISTIC MATERIAL SAMPLES FOR  
AIRCRAFT ARMOR SYSTEMS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
JAN 69 28P RODZEN,R. A. LAMBERT,C.  
F. ISCRIBANO,F. C. BURNS,M. ;  
CONTRACT: DA-19-129-AMC-641(N)  
PROJ: DA-1-F-162203-A-150  
TASK: 1-F-162203-A-15004  
MONITOR: USA-NLABS,C/PLSEL

TR-69-61-CE-62

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BODY ARMOR, \*FLIGHT CREWS), (\*CERAMIC  
MATERIALS, BODY ARMOR), MANUFACTURING, ALUMINA,  
HOLDINGS, CONFIGURATION

(U)

IDENTIFIERS: \*ARMOR, \*CERAMIC MATERIALS

(U)

THE REPORT DESCRIBES THE INVESTIGATIVE, RESEARCH  
AND EXPERIMENTAL EFFORT NECESSARY TO VERIFY THE  
COMMERCIAL PRODUCIBILITY OF THE AIRCRAFT ARMOR  
CONFIGURATIONS DEVELOPED UNDER THE CONTRACT. THIS  
WAS A COOPERATIVE EFFORT WITH INDUSTRY, TO IDENTIFY  
TYPICAL PROBLEM AREAS, SOLUTIONS AND COMPROMISES  
NECESSARY TO MAKE SUCH ARMOR PRODUCIBLE. ALSO  
DESCRIBED AND ILLUSTRATED ARE THE CERAMIC SAMPLES  
WHICH WERE FABRICATED TO VERIFY PRODUCIBILITY OF THE  
ARMOR CONFIGURATIONS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-695 644 19/4 11/5  
TEXTILE RESEARCH INST PRINCETON N J

A STUDY OF FELTS FOR PERSONAL ARMOR.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
AUG 69 29P LYONS, W. JAMES ISCARDINO,  
FRANK L. GOSWAMI, B. C.  
CONTRACT: DAAG17-68-C0040  
PROJ: DA-1-M-624101-U-504  
MONITOR: USA-NLABS,C/PLSEL TR-70-13-CE, TS-164

UNCLASSIFIED REPORT

DESCRIPTORS: (•BODY ARMOR, TEXTILES), SYNTHETIC FIBERS,  
GEOMETRIC FORMS, MECHANICAL PROPERTIES, MANUFACTURING,  
SURFACE ROUGHNESS, FRICTION, TEST METHODS, RUPTURE,  
NYLON, PROPENES, TENSILE PROPERTIES, PROTECTION,  
POLYETHYLENE PLASTICS

(U)

IDENTIFIERS: COHESION, FELTS, POLYPROPYLENE  
FIBERS

(U)

THE STUDY WAS CONCERNED WITH THE INFLUENCE OF  
VARIOUS GEOMETRIC AND MECHANICAL CHARACTERISTICS OF  
THE CONSTITUENT FIBERS, AND SOME PROCESSING FACTORS  
SUCH AS THE AMOUNT OF NEEDLING AND THE BLENDING OF  
FIBERS, ON THE COHESION OF NEEDLED FELTS. TESTS  
WERE CONDUCTED ON SINGLE FIBERS FOR SURFACE-ROUGHNESS  
AND FRICTIONAL FORCE CHARACTERISTICS AND MECHANICAL  
PROPERTIES. LENGTH ANALYSES WERE ALSO MADE ON  
GROUPS OF FIBER SAMPLES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-696 481 19/4 5/9  
ARMY NATICK LABS MASS PIONEERING RESEARCH LAB

EVALUATION OF ARMY AIRCREW PROTECTIVE ARMOR IN VIETNAM.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
JUN 54 60P MCGINNIS, JOHN M.; BURSE,  
RICHARD L.; PEAKRON, EDWARD R.;  
REPT. NO. EPT-9  
PROJ: DA-1-C-L24701-A-121  
TASK: 1CG247U1A12102  
MONITOR: USA-NLABS TR-69-79-PR

UNCLASSIFIED REPORT

DESCRIPTORS: (\*AERIAL WARFARE, VIETNAM), (\*PILOTS, BODY ARMOR), (\*BODY ARMOR, COMPATIBILITY), HUMAN FACTORS ENGINEERING, HELICOPTERS, ARMOR PIERCING AMMUNITION, ACCEPTABILITY

(U)

IDENTIFIERS: EVALUATION

(U)

THIRTY FIVE U. S. ARMY HELICOPTER CREW MEMBERS EVALUATED THE DESIGN FEATURES AND ACCEPTABILITY OF .30 CALIBER ARMOR-PIERCING PROTECTIVE ARMOR ON PRACTICE OR ACTUAL LIVE-FIRE AERIAL MISSIONS IN SOUTH VIETNAM. TWENTY PILOTS USED TORSO FRONT PROTECTIVE ARMOR, AND 15 CREW CHIEFS AND DOOR GUNNERS USED TORSO FRONT PROTECTIVE ARMOR, TORSO BACK PROTECTIVE ARMOR AND SEAT/GROIN PROTECTIVE UNITS. THEY RATED THE FOLLOWING VARIABLES: FIT, COMFORT, INTERFERENCE WITH MOVEMENT, SUITABILITY OF OUTLINE AND CONTOUR, ACCEPTABILITY OF ARMOR BEFORE AND AFTER EXPERIENCE WITH THE LATEST ITEMS, DESIRABILITY OF PARTICULAR ITEMS ON PARTICULAR MISSIONS AND BODY AREAS REQUIRING PROTECTION.

(AUTHOR)

(U)

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DDC REPORT LIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-707 910 11/5 19/4  
ARMY Natick LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT  
EQUIPMENT LAB

A REVIEW OF THE DEVELOPMENT OF BALLISTIC NEEDLE-  
PUNCHED FELTS.

(U)

DESCRIPTIVE NOTE: SUMMARY REPT. 1961-69,  
OCT 69 56P LAIBLE, ROY C.; HENRY,  
MALCOLM C.;  
REPT. NO. C/PSEL-TS-167  
PROJ: DA-1-T-U62105-A-329  
TASK: I-T-U62105-A-32902  
MONITOR: USA-NLA9S TR-70-32-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (\*TEXTILES, \*BODY ARMOR), TERMINAL  
BALLISTICS, DENSITY, MANUFACTURING, THICKNESS  
IDENTIFIERS: \*FELTS

(U)  
(U)

AS PART OF THE CONTINUING EFFORT TO IMPROVE  
BALLISTIC MATERIALS FOR PERSONNEL ARMOR, THE FIBER  
AND FABRICATION PARAMETERS, DYNAMICS OF FELT IMPACT,  
AND PREDICTIVE EQUATIONS ATTEMPTING TO CONNECT  
BALLISTIC RESISTANCE TO KNOWN MEASURABLE PARAMETERS  
WERE REVIEWED FOR NEEDLE-PUNCHED FELTS. THE  
BALLISTIC RESISTANCE OF NEEDLE-PUNCHED FELTS AT LOW  
AREAL DENSITIES WAS FOUND TO BE SUPERIOR TO THAT OF  
ANY OTHER KNOWN MATERIAL. ON THE OTHER HAND, AT  
INCREASED AREAL DENSITIES AND AGAINST HIGHER VELOCITY  
MISSILES, OTHER MATERIALS BECOME COMPETITIVE. THE  
EXTENT TO WHICH NEEDLE-PUNCHED FELTS MAINTAIN THEIR  
SUPERIORITY TO OTHER MATERIALS AT MODERATE AREAL  
DENSITIES IS DEPENDENT UPON CERTAIN FIBER AND  
FABRICATION PROPERTIES. THE HIGHEST TENACITY  
POLYAMIDE FIBERS ARE CURRENTLY THE BEST AVAILABLE  
MATERIAL. IN THE CASE OF FABRICATION, A RELATIVELY  
LOW DEGREE OF NEEDLING FURNISHES THE BEST BALLISTIC  
PROPERTIES. IN GENERAL, THE THICKER THE FELT THAT  
CAN BE TOLERATED (AT THE SAME WEIGHT AND AREAL  
DENSITY), THE BETTER THE BALLISTIC RESISTANCE. IN  
ADDITION, IT IS APPARENT THAT THE LEVEL OF BALLISTIC  
PROTECTION VARIES DEPENDING UPON THE METHOD OF  
ATTAINING THE DESIRED THICKNESS. THE NEED IS SHOWN  
FOR ADDITIONAL WORK TO DETERMINE THE EFFECT OF FIBER  
PROPERTIES SUCH AS FIBER DENIER, MOLECULAR WEIGHT,  
MOLECULAR WEIGHT DISTRIBUTION, AND ELONGATION UPON  
THE BALLISTIC PROPERTIES OF THE RESULTING FELTS.

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-711 876 19/4 5/5 14/2  
IIT RESEARCH INST CHICAGO ILL

DESIGN, DEVELOPMENT AND FABRICATION OF A PERSONNEL  
ARMOR LOAD PROFILE ANALYZER. (U)

DESCRIPTIVE NOTE: FINAL REPT.,  
APR 70 100P SCRIBANO,F. ;BURNS,M. ;  
BARROW,E. R. ;  
CONTRACT: DAAG17-69-C-0008  
PROJ: DA-1-F-164204-D-154, IITRI-J6162-FR  
MONITOR: USA-NLABS,C/PLSEL TR-70-65-CE,75

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BODY ARMOR, \*DETECTORS), ANTHROPOMETRY,  
PERFORMANCE(HUMAN), POSITIONING REACTIONS, LOAD  
DISTRIBUTION, DISPLAY SYSTEMS, RELIABILITY(ELECTRONICS),  
PSYCHOPHYSIOLOGY, PERCEPTION, SENSITIVITY (U)

THE PURPOSE OF THE PROGRAM WAS TO DESIGN, DEVELOP,  
AND FABRICATE AN INSTRUMENT WHICH COULD LOCATE AND  
SENSE LOADS INDUCED ON THE BODY OF A PERSON WEARING  
PROTECTIVE ARMOR, AND TO COMPARE SUSPENSIONS AND  
SUGGEST IMPROVEMENTS WHICH COULD BE INCORPORATED IN  
CURRENT OR FUTURE LOAD-CARRYING SYSTEMS. THE  
DEVELOPMENT OF A 'PERSONNEL ARMOR LOAD'  
PROFILE ANALYZER SAW THE ATTAINMENT OF A METHOD  
OF SENSING LOADS, THE INTEGRATION AND POSITIONING OF  
SENSORS IN A SUITABLE GARMENT, A METHOD OF DISPLAYING  
INFORMATION, AND THE CORRELATION OF OUTPUT DATA TO  
TORSO SENSITIVITY. IT WAS FOUND THAT ARMOR  
SUSPENSION SYSTEMS COULD EFFECTIVELY BE EVALUATED  
USING THIS INSTRUMENT. STATIC AND DYNAMIC LOAD  
PATTERNS WERE DISPLAYED AND THE SHIFT IN THESE  
PATTERNS WITH ARTICULATION COULD BE OBSERVED. THE  
DATA OBTAINED FROM THE DISPLAY COULD PROVIDE  
GUIDELINES FOR IMPROVING SUSPENSION SYSTEM DESIGN BY  
DETERMINING WHETHER A PARTICULAR SUSPENSION WAS  
EFFECTIVE IN DISTRIBUTING LOADS ON THE OPTIMUM LOAD-  
BEARING AREAS OF THE TORSO. THE PROGRESSIVE  
ELECTRICAL CONTACT SENSOR APPROACH PROVIDED A DIRECT  
READING SYSTEM WITH MAXIMUM RELIABILITY, RUGGEDNESS,  
AND VERSATILITY. IN ADDITION, THE SYSTEM DID NOT  
REQUIRE SPECIAL SIGNAL CONDITIONING EQUIPMENT. THE  
VARIABLE INDUCTANCE SENSOR APPROACH PRODUCED AN  
ANALOG SENSOR OUTPUT CONVERTED TO A DIGITAL DISPLAY.  
(AUTHOR) (U)

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/ZAAI4

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-713 016 19/4  
IIT RESEARCH INST CHICAGO ILL

ADVANCED AIRCREW ARMOR SUSPENSION SYSTEMS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 7 AUG 68-30 APR 69,  
JAN 70 96F SCRIBANO, FRANK C. ;BURNS,  
MARVIN ;

CONTRACT: DAAG17-68-C-0029

PROJ: DA-1-F-162203-A-150, IITRI-J6053

MONITOR: USA-NLABS,C/PLSEL

TR-70-51-CE,74

UNCLASSIFIED REPORT

DESCRIPTORS: (BODY ARMOR, SUSPENSION DEVICES), FLIGHT CREWS, CONFIGURATION, OPTIMIZATION, DESIGN (U)

THE IMPROVEMENT OF AIRCREW ARMOR SUSPENSION SYSTEMS WAS THE GOAL OF THIS PROJECT. DEFICIENCIES IN ARMOR CARRIERS WERE RECOGNIZED IN EARLIER ARMOR PROGRAMS. ATTEMPTS WERE MADE TO ELIMINATE THESE DEFICIENCIES, BUT THE RESULTS WERE MINIMAL SINCE THE MAJOR DESIGN EFFORT WAS FOCUSED ON THE OPTIMIZATION OF ARMOR CONFIGURATIONS AND THE DEVELOPMENT OF AN ARMOR SIZING SYSTEM. ARMOR SUSPENSION SYSTEMS RECEIVED PRIME CONSIDERATION IN THIS PROGRAM, AND THE GOALS WERE TO DESIGN THOSE WHICH WOULD IMPROVE COMFORT, MOBILITY, PERIPHERAL PROTECTION, VENTILATION, AND RAPID DOFFING. CHARACTERISTICS WERE ALSO GIVEN CONSIDERATION. THE SUSPENSION AND LOAD DISTRIBUTION PRINCIPLES USED IN OTHER FIELDS INVOLVING LOAD-BEARING EQUIPMENT WERE SURVEYED AND APPLIED WHEREVER PRACTICABLE IN THE IMPROVEMENT OF ARMOR SUSPENSIONS. THE AIRCREW ARMOR SUSPENSION SYSTEMS DESIGNED, DEVELOPED AND FABRICATED DURING THE STUDY INDICATE SIGNIFICANT ADVANCES OVER PREVIOUS ARMOR CARRIERS. THE SUSPENSION CONCEPTS DEVELOPED ARE REVIEWED. THE PROTOTYPES INCORPORATING THE SUSPENSION TECHNIQUES DERIVED FROM THE STUDY ARE DISCUSSED IN DETAIL, AND THE RESULTS OF A PROTOTYPE EVALUATION STUDY CONDUCTED ON A GROUP OF TEST SUBJECTS ARE PRESENTED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-719 212 19/4 14/2  
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND  
MD

BALLISTIC TESTING OF PERSONNEL ARMOR  
MATERIALS.

(U)

DESCRIPTIVE NOTE: MATERIEL TEST PROCEDURE.

OCT 68 19P  
REPT. NO. MTP-1D-2-506

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUPERSEDES ORDNANCE PROOF MANUAL  
50-30.

DESCRIPTORS: (•BODY ARMOR, TEST METHODS), PENETRATION,  
PROJECTILES, PROTECTION (U)

IDENTIFIERS: BALLISTICS, PROTECTION, COMMON  
ENGINEERING TEST PROCEDURES (U)

THE OBJECTIVE OF THIS TEST PROCEDURE IS TO EVALUATE  
THE RESISTANCE OF THE MATERIAL USED IN PERSONNEL  
ARMOR TO PENETRATION BY PROJECTILE FRAGMENTS AND  
SMALL ARMS AMMUNITION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-719 551 19/4  
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE  
VA

KNIGHTS OF THE TWENTIETH CENTURY (RYTSALI  
DVADTSATEGO VEKA),

(U)

SEP 70 14P ZHOLONDKOVSKII, O. ;  
REPT. NO. FSTC-M1-23-1051-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. FROM TEKHNIKA MOLODEZHI  
(USSR) V37 NII 1969.

DESCRIPTORS: (•BODY ARMOR, HISTORY), USSR

(U)

IDENTIFIERS: TRANSLATIONS

(U)

THE REPORT TRACES THE DEVELOPMENT OF PROTECTIVE  
ARMOR WORN BY SOLDIERS FROM ANCIENT TIMES TO THE  
PRESENT. ARMUR WAS WIDELY UTILIZED DURING THE  
MIDDLE AGES, BUT ITS USE DECLINED AS FIREARMS BECAME  
MORE SOPHISTICATED. WORLD WAR I, HOWEVER, SAW  
THE RETURN OF PROTECTIVE PLATES AND HELMETS. THE  
BRITISH FIRM OF PARRATS WAS ESPECIALLY NOTED FOR  
ITS PRODUCTION OF BULLET-PROOF VESTS AND STEEL  
DERBYS. DURING WORLD WAR II BULLET PROOF  
ARMOR WAS ADOPTED BY INDIVIDUAL UNITS OF THE SOVIET  
ARMY. STEEL ARMOR COVERED THE CHEST, STOMACH,  
AND BACK OF RED SOLDIERS. RUSSIAN HELMETS ALSO  
PROVED TO BE VERY GOOD; THEY HAVE BEEN RETAINED  
WITHOUT CHANGE UP TO OUR TIME. WITH THE DEVELOPMENT  
OF POLYMER CHEMISTRY, EXPERIMENTS ON THE COMPOSITION  
OF HELMETS MADE FROM NEW, SYNTHETIC MATERIALS BEGAN  
TO BE CONDUCTED IN MANY ARMIES OF THE WORLD.  
SCIENTIFIC RESEARCH CENTERS ARE ALSO MAKING  
MILITARY ARMOR VESTS. DESIGNERS ARE ALSO CONCERNED  
ABOUT SOLDIERS FEET; A STEEL, V-SHAPED PLATE IS  
ATTACHED TO THE SOLE OF BOOTS TO REFLECT SHRAPNEL  
FROM ANTI PERSONNEL MINES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT OINLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-726 91d 19/4 11/5  
UNIRAYAL INC WAYNE N J

BICOMPONENT AND BICONSTITUENT FIBERS IN  
BALLISTIC FABRIC FOR PERSONNEL ARMOR.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
APR 71 27P OLSON, M. W. BRICE, G. H.

;

CONTRACT: DAAG17-70-C-0032

PROJ: DA-1-T-U62105-A-329

MONITOR: USA-NLABS,C/PLSEL

TR-71-48-CE,

TS-173

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BODY ARMOR, \*SYNTHETIC FIBERS),  
(\*TEXTILES, BODY ARMOR), POLYESTER PLASTICS, NYLON,  
POLYETHYLENE PLASTICS, MIXTURES

(U)

IDENTIFIERS: POLYESTER FIBERS, POLYPROPYLENE  
FIBERS

(U)

EXPERIMENTAL FIBERS HAVE BEEN SPUN FROM INTIMATE  
MIXTURES OF NYLON, POLYPROPYLENE AND POLYESTER  
PLASTICS (BICONSTITUENT TYPE) FOLLOWING AN  
EXTENSIVE SCREENING PROGRAM TO DETERMINE  
COMPATIBILITIES. FIBERS OF THE BICOMPONENT TYPE  
(SHELL/CORE AND BILATERAL) HAVE ALSO BEEN SPUN  
FROM SEVERAL COMBINATIONS. A TOTAL OF SIX  
COMBINATIONS OF BOTH TYPES PLUS A 100% NYLON  
CONTROL HAVE BEEN SPUN IN SUFFICIENT QUANTITY TO BE  
WOVEN INTO BALLISTIC FABRIC AND TESTED ON A FIRING  
RANGE. ALL SEVEN FABRICS SHOWED AN APPRECIABLY  
LOWER BALLISTIC RESISTANCE (V50) THAN A STANDARD  
NYLON BALLISTIC FABRIC BUT PROCESSING DIFFICULTIES  
DURING THE SPINNING OPERATION MAY HAVE BEEN  
RESPONSIBLE, AT LEAST IN PART, FOR THE POOR SHOWING.  
WHEN COMPARISONS ARE MADE WITHIN THE SERIES THERE  
IS EVIDENCE THAT A SHELL/CORE FIBER MADE FROM NYLON  
AND POLYPROPYLENE COULD BE DEVELOPED INTO AN IMPROVED  
BALLISTIC FABRIC. (AUTHOR)

(U)

UNCLASSIFIED

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-729 353 19/4  
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT  
EQUIPMENT LAB

A HISTORY OF THE DEVELOPMENT OF AN ARMOR  
ENSEMBLE FOR MINE CLEARANCE PERSONNEL.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
OCT 7U 40P LASTNIK,ABRAHAM L. ;  
REPT. NO. C/PLSEL-84  
MONITOR: USA-NLABS TR-71-30-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BODY ARMOR, \*MINE CLEARANCE), MILITARY  
REQUIREMENTS, HAZARDS, SAFETY, PROTECTIVE CLOTHING,  
MATERIALS, MANUFACTURING METHODS (U)

MINE CLEARANCE TEAMS HAVE ALWAYS TRIED TO ADAPT  
AVAILABLE ARMOR CLOTHING TO THEIR OPERATIONS WITH  
VARYING DEGREES OF SUCCESS. THE REPORT IS  
CONCERNED WITH THE HISTORY OF THE DEVELOPMENT OF A  
FULL BODY COVERAGE ARMOR FOR MINE CLEARANCE PERSONNEL  
TO SATISFY MILITARY REQUIREMENTS. DISCUSSIONS ARE  
CONCERNED WITH THE HAZARDS OF MINE CLEARANCE  
VULNERABLE BODY AREAS, OPERATIONAL CONCEPTS, DESIGN,  
PROTECTIVE CHARACTERISTICS AND FABRICATION OF THE  
ENSEMBLE, AND ITS EVALUATION. A SUMMARY OF RECENT  
ARMOR MATERIAL DEVELOPMENTS AND TYPICAL APPLICATIONS  
IS INCLUDED. THESE MATERIALS MAY BE APPLIED TO ANY  
FUTURE CONCEPTS FOR FULL BODY ARMOR. (AUTHOR)9 (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-730 775 11/5 18/4  
MONSANTO RESEARCH CORP DURHAM N C

EXPERIMENTAL ORGANIC FIBER MATERIALS FOR  
PERSONNEL ARMOR.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
JAN 71 44P LILYQUIST, MARVIN R.;  
CONTRACT: DAAG17-69-C0079  
PROJ: DA-1-J-662708-DJ-40  
MONITOR: USA-NLABS,C/PLSEL TR-71-47-CE,  
TS-177

UNCLASSIFIED REPORT

DESCRIPTORS: (•BODY ARMOR, •FIBERS(SYNTHETIC)), TERMINAL  
BALLISTICS, TENSILE PROPERTIES, MODULUS OF ELASTICITY,  
PLASTICS, LAMINATES, DENSITY, TEXTILES, DUCTILITY (U)  
IDENTIFIERS: EVALUATION, FELTS (U)

A NEW HIGH PERFORMANCE ORGANIC FIBER HAVING AN  
UNUSUALLY BROAD RANGE OF POSSIBLE FIBER PHYSICAL  
PROPERTIES, DESIGNATED AS X-500, WAS STUDIED IN  
VARIOUS CONSTRUCTIONS FOR BALLISTIC PERFORMANCE AS A  
POSSIBLE MATERIAL FOR IMPROVING PERSONNAL BODY ARMOR.  
TENSILE PROPERTIES OF THIS FIBER SPAN A WIDE RANGE  
OF VALUES FROM THOSE SIMILAR TO NYLON AND POLYESTER  
TO THOSE SIMILAR TO FIBERGLASS. THE MODULUS,  
HOWEVER, IS HIGHER THAN THAT FOR NYLON OR POLYESTER  
FIBERS. THREE TYPES OF THIS FIBER WERE SPUN HAVING  
SINGLE FILAMENT PROPERTIES SPANNING THE ACHIEVABLE  
RANGE OF THE X-500 FIBER SYSTEM. WORK WAS DIVIDED  
INTO FOUR DISTINCT PHASES OF EVALUATION: FIBER  
YARN; BALLISTIC FABRIC; BALLISTIC FELTS; AND  
BALLISTIC FABRIC-RESIN LAMINATES. IN EACH PHASE,  
SAMPLES WERE TESTED USING EXISTING BALLISTIC  
MATERIALS SPECIFICATIONS AS GUIDELINES.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-731 000 6/7 19/4  
MONSANTO RESEARCH CORP DAYTON OHIO

FOAM FLOTATION SYSTEMS FOR PERSONNEL  
WEARING BODY ARMOR.

(U)

DESCRIPTIVE NOTE: FINAL REPT. FEB 69-SEP 70,  
JUL 71 114P SALYER, J. O. : SCHWENDEMANN,  
J. L. : ROJTOVICZ, A. : JEFFERSON, R. T. : SUN,  
S. M. :

CONTRACT: DAAG17-69-C-0017

PROJ: DA-1-F-164207-DC-G2

MONITOR: USA-NLABS,C/PLSEL

72-3-CE, 87

UNCLASSIFIED REPORT

DESCRIPTORS: (+BODY ARMOR, \*FLOTATION), (+EXPANDED  
PLASTICS, FLOTATION), (+FOAMS, FLOTATION), (+SEA RESCUE  
EQUIPMENT, FEASIBILITY STUDIES), AIR FORCE PERSONNEL,

AIR-SEA RESCUES, PLASTICS

(U)

IDENTIFIERS: POLYURETHANE FOAMS, URETHANES

(U)

A FEASIBILITY STUDY WAS CONDUCTED ON APPROACHES TO  
USING FOAMS IN FLOTATION SYSTEMS FOR PERSONNEL  
WEARING BODY ARMOR. FLOTATION SYSTEMS SHOULD BE  
RAPIDLY DEPLOYABLE (10 SECONDS) AND PROVIDE  
FLOTATION FOR AT LEAST SIX HOURS, EVEN IF DAMAGED.  
THESE SYSTEMS SHOULD NOT INTERFERE WITH THE WEARER  
AS HE PERFORMS HIS DUTIES. THREE APPROACHES WERE  
INVESTIGATED: (1) THE USE OF PREFORMED FLEXIBLE  
FOAM; (2) INSTANTLY GENERATED POLYSTYRENE FOAM;  
AND (3) FAST REACTING TWO-COMPONENT URETHANE  
FOAMS. ONLY THE PREFORMED FLEXIBLE FOAM PERFORMED  
WELL WHEN FABRICATED INTO A JACKET AND TESTED ON A  
MAN. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAA14

AD-737 725 11/5 19/4  
UNIVERSITY OF MANCHESTER INST OF SCIENCE AND TECHNOLOGY  
(ENGLAND)

RESEARCH ON ENERGY ABSORPTION BY NONWOVEN  
FABRICS.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. OCT 70-SEP 71,  
NOV 71 46P HEARLE, J. W. S. SPURDY,

A. T. I

CONTRACT: DAJA37-71-C-0554

PROJ: DA-I-J-652703-D-504

UNCLASSIFIED REPORT

DESCRIPTORS: {TEXTILES, +TERMINAL BALLISTICS}, {BODY ARMOR, COMPOSITE MATERIALS}, PROJECTILES, PENETRATION TESTS, DEFORMATION, SHOCK RESISTANCE, TENSILE

PROPERTIES, THICKNESS, GREAT BRITAIN

(U)

IDENTIFIERS: ENERGY ABSORBERS

(U)

THE OBJECT OF THE WORK HAS BEEN TO GAIN A GREATER UNDERSTANDING OF THE MEANS BY WHICH NEEDLED FABRIC ABSORBS ENERGY WHEN STRUCK TRANSVERSELY BY A PROJECTILE. NEEDLE PUNCHED FABRIC HAS BEEN SUBJECTED TO A SLOW SPEED PENETRATION TEST USING A RIGID STEEL PROBE, AND TO IMPACT WITH A FREE FLYING PROJECTILE. THE FIRST METHOD OF TEST HELPED ESTABLISH THE MECHANISM BY WHICH THIS MATERIAL DEFORMS DURING IMPACT. DURING HIGH SPEED TESTS DEFORMATION WAS STUDIED USING HIGH SPEED CINE PHOTOGRAPHY AND VARIOUS PHENOMENA OBSERVED. DETAILED OBSERVATION OF FABRIC BEHAVIOUR AROUND THE IMPACT POINT WHEN MULTILAYER SAMPLES ARE IN USE HAS BEEN CARRIED OUT USING AN EMBEDDING AND SECTIONING TECHNIQUE. PROJECTILES EXTEND FABRIC UNTIL THICKNESS IS REDUCED AND NO FURTHER RESISTANCE IS OFFERED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-751 155 19/4 14/2  
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND  
MD

BODY ARMOR.

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON TEST OPERATIONS  
PROCEDURE.

JUL 72 16P  
REPT. NO. TOP-10-3-022

UNCLASSIFIED REPORT

DESCRIPTORS: (BODY ARMOR, TEST METHODS), SAFETY,  
MILITARY TRAINING, TESTS, RELIABILITY, HUMAN FACTORS  
ENGINEERING (U)

THE DOCUMENT DESCRIBES A METHOD FOR EVALUATION OF  
BODY ARMOR FUNCTIONAL PERFORMANCE CHARACTERISTICS.  
IT IDENTIFIES SUPPORTING TESTS, FACILITIES, AND  
EQUIPMENT REQUIRED, AND PROVIDES PROCEDURES FOR  
PREOPERATIONAL INSPECTION, PHYSICAL CHARACTERISTICS,  
SAFETY, PERSONNEL TRAINING, SIZING, FITTING,  
COMPATIBILITY WITH COMBAT TASKS, DURABILITY,  
RELIABILITY, CARE, MAINTENANCE, HUMAN FACTORS, AND  
VALUE ANALYSIS. APPRECIABLE TO BODY ARMOR DESIGNED  
FOR PROTECTION OF SELECTED AREAS FROM THE NECK TO THE  
ANKLES. EXCLUDES HEAD ARMOR, FOOT ARMOR, AND  
BALLISTIC TESTING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-752 792 14/4  
NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

THE DEVELOPMENT OF A NAVY, BUOYANT, ANTI-FRAGMENT, BULLETPROOF VEST: PROTECTION AGAINST LOW-VELOCITY FRAGMENTS, SECONDARY (SPALL) FRAGMENT DAMAGE, AND 30-CALIBER-BALL PROJECTILES.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
NFM 72 24P SILVIA, JOHN; REINS, DALE A.  
SHAMPINE, JAMES C. I  
REPT. NO. 1R-165, 2-72

UNCLASSIFIED REPORT

DESCRIPTORS: (BODY ARMOR, DESIGN), NAVAL EQUIPMENT,  
PROTECTIVE CLOTHING, ARMOR PLATE, BUOYANCY,  
STRESS(PHYSIOLOGY), TEST METHODS

(U)

THE NAVY CLOTHING AND TEXTILE RESEARCH UNIT HAS DEVELOPED TWO, EXPERIMENTAL, BUOYANT, ANTI-FRAGMENT, BULLETPROOF VESTS WHICH PROVIDE LOW-VELOCITY PROTECTION AGAINST MORTAR SHELL BURSTS AND SECONDARY FRAGMENTS (SPALL). PROVIDE PROTECTION AGAINST 30-CALIBER, SMALL-ARMS FIRE AND PROVIDE EMERGENCY, INHERENT BUOYANCY. EACH MODEL CONSISTS OF A CARRIER WHICH HAS FRONT AND BACK PANELS THAT CONTAIN A 30-CALIBER-BALL, BODY-ARMOR PLATE, A COMBINATION OF FELT AND/OR WOVEN BALLISTIC MATERIALS AND LAYERS OF BUOYANT, UNICELLULAR FOAM.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-752 903 5/9 5/5 19/4  
HUMAN ENGINEERING LAB ABERDEEN PROVING GROUND MD

EVALUATION OF RIFLE-FIRING BEHAVIOR OF  
TROOPS EQUIPPED WITH BODY A. R: A  
PILOT STUDY. (U)

DESCRIPTIVE NOTE: TECHNICAL NOTE,  
SEP 72 13P CORONA, BERNARD M.; ELLIS,  
PAUL H.; JONES, R.; DOUGLAS; PANDALL, R.  
BRADLEY; SCHLETZ, MAYDEN A.;  
REPT. NO. HEL-TN-14-72

UNCLASSIFIED REPORT

DESCRIPTORS: (ARMY PERSONNEL, PERFORMANCE(HUMAN)),  
(BODY ARMOR, ARMY PERSONNEL), ADAPTATION(PHYSIOLOGY),  
REACTION(PSYCHOLOGY), PERFORMANCE(HUMAN),  
ADJUSTMENT(PSYCHOLOGY), FIRING TESTS(ORDNANCE), ANALYSIS  
OF VARIANCE, HUMAN FACTORS ENGINEERING (U)  
IDENTIFIERS: EVALUATION (U)

TWENTY ENLISTED MEN, EQUIPPED WITH TWO TYPES OF  
BODY ARMOR FIRED THE M16 AT POP-UP TARGETS. THE  
RANGE WAS ELECTRONICALLY INSTRUMENTED TO RECORD SHOTS  
AND HITS, AS WELL AS RELATIONSHIPS BETWEEN THESE  
EVENTS. EACH SUBJECT FIRED 180 ROUNDS AT TARGETS  
WHICH APPEARED FOR TWO, FOUR AND SIX-SECOND  
PRESENTATION INTERVALS. THE RESULTS SHOWED NO  
SIGNIFICANT DIFFERENCE BETWEEN STANDARD NYLON VEST,  
NYLON TITANIUM VEST OR NO-VEST CONDITIONS AS SUBJECTS  
FIRED FROM THE STANDING POSITION. FURTHER, IT WAS  
EVIDENT THAT THE SHOOTER'S PERFORMANCE DURING TWO-  
SECOND PRESENTATIONS DIFFERED SIGNIFICANTLY FROM  
PERFORMANCE DURING FOUR AND SIX-SECOND EXPOSURES.  
IT WAS CONCLUDED THAT BODY ARMOR ALONE DOES NOT  
AFFECT RIFLE-FIRING BEHAVIOR FOR EITHER ACCURACY OR  
FIRING TIME, THAT SUBSEQUENT INVESTIGATIONS NEED NOT  
INCLUDE FOUR OR SIX SECOND PRESENTATION TIMES, AND  
THAT FURTHER RESEARCH ON RIFLE-FIRING BEHAVIOR SHOULD  
EXPLORE COMPLETE EQUIPMENT ENSEMBLES, INCLUDING LOAD-  
CARRYING GEAR. (AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-753 93/ 1974 5/5  
ARMY NATICK LABS MASS

SOME EFFECTS OF BODY ARMOR ON MOTOR  
PERFORMANCE. PART I. EFFECTS OF STANDARD  
(135 PLATE) AND EXPERIMENTAL (48 PLATE)  
TITANIUM-NYLON BODY ARMOR ON MOTOR  
PERFORMANCE. PART II. ARMOR AND LOAD  
INDUCED PATTERNS OF PRESSURE ON THE TORSO  
DURING MOTOR PERFORMANCE.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
OCT 72 51P MCGINNIS, JOHN M. :  
REPT. NO. USA-NLA95-TR-73-13-PR  
PROJ: DA-1-J-664713-DL-40, DA-1-T-062106-A-121  
TASK: 1-J-664713-DL-4043, 1-T-062106-A-12102

UNCLASSIFIED REPORT

DESCRIPTORS: (BODY ARMOR, PERFORMANCE(HUMAN)), HUMAN  
FACTORS ENGINEERING, TITANIUM, NYLON, TEXTILES,  
PRESSURE, DETECTORS, ANALYSIS OF VARIANCE, PHYSIOLOGY(U)  
IDENTIFIERS: COMFORT (U)

NINE PSYCHOMOTOR TASKS DESIGNED FOR LABORATORY USE  
MEASURED THE PERFORMANCE OF 10 SOLDIER TEST SUBJECTS  
WHILE WEARING M1956 LIGHTWEIGHT LOAD CARRYING  
EQUIPMENT (LCE) ALONE AND OVER STANDARD (135  
PLATE) AND EXPERIMENTAL (48 PLATE) TITANIUM-  
NYLON BODY ARMOR. SCORES BASED ON LCE ONLY, ON  
EXPERIMENTAL ARMOR AND LCE, AND ON STANDARD ARMOR  
PLUS LCE ARE COMPARED. IN LABORATORY INTERVIEWS,  
SUBJECTS APPEARED TO PREFER LOAD CARRYING EQUIPMENT  
WORN WITHOUT ARMOR TO LCE WORN OVER EITHER TYPE OF  
ARMOR, AND THEY COMMENTED ON SPECIFIC ARMOR PROBLEMS.  
NEXT, A LIGHTWEIGHT CLOTH SENSOR GARMENT  
INCORPORATING PRESSURE SENSORS WAS USED TO MEASURE  
PRESSURE AT VARIOUS LOCATIONS ON A TEST SUBJECT'S  
TORSO AS HE PERFORMED TASK. PERFORMANCE AND DISPLAY  
WERE RECORDED IN COLOR ON THE SAME MOTION PICTURE  
FILM, FOR EACH OF SIX ARMOR-LOAD COMBINATIONS.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-756 367 19/4  
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT  
EQUIPMENT LAB

BALLISTIC AND SPALL TESTS FOR AIRCREW BODY  
ARMOR.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
AUG 72 74P JUDGE, THOMAS H. BUTTKUS,  
PAUL J. :  
REPT. NO. C/PSEL-98  
PROJ: DA-1-F-164207-DC-52  
MONITOR: USA-VLASS TR-73-9-CE

UNCLASSIFIED REPORT

DESCRIPTORS: \*BODY ARMOR, \*TERMINAL BALLISTICS,  
(\*FLIGHT CREWS, BODY ARMOR), FRAGMENTATION, PROTECTION,  
PROJECTILES, TEXTILES, DESIGN, NYLON (U)  
IDENTIFIERS: \*SPALLING (U)

A NEW INTEGRATED BODY ARMOR CARRIER SYSTEM IS  
DESIGNED TO REDUCE SPALL WHEN THE ARMOR PLATE IS  
IMPACTED BY .30 CALIBER SMALL ARMS FIRE. BALLISTIC  
TESTS, WHEN COMPARED TO PREVIOUS DATA, SHOWED THIS  
SYSTEM EXHIBITED GREATER SPALL SUPPRESSION THAN THE  
STANDARD AIRCREW ARMOR IN USE IN VIETNAM. THE  
SYSTEM ALSO PROVIDES SECONDARY FRAGMENTATION  
PROTECTION TO AREAS OF THE TORSO NOT COVERED BY THE  
PLATE INSEPT. RESULTS INDICATE THAT THE NEW VEST-  
CARRIER SYSTEM MADE OF NYLON 128 SHOULD BE TYPE  
CLASSIFIED AS STANDARD 'A'. INJURY BY FLYING  
SPALL HAS BEEN REDUCED, BUT A CONTINUING PROGRAM IS  
NEEDED TO ESTABLISH ADVANCED DESIGN CRITERIA, TEXTILE  
AND OTHER MATERIAL CAPABILITIES TO SUPPRESS ALL  
SPALL, GENERATED FROM OBLIQUITY STRIKES ON AIRCREW  
ARMOR BY .30 CALIBER AP PROJECTILES.  
(AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-758 910 14/2 6/14 19/4  
IIT RESEARCH INST CHICAGO ILL

DESIGN AND DEVELOPMENT OF A FULL-SCALE  
ANATOMICAL LOAD DISTRIBUTION ANALYZER.

(U)

DESCRIPTIVE NOTE: FINAL REPT. MAY 70-FEB 72,  
NOV 72 60P RODZEN,R; OGDEN,C.;

SCRIBANG,F.; BURNS,M.; BARRON,E. R.;

CONTRACT: JRAUG17-70-C-0161

PROJ: SA-1-F-164204-D-154

MONITOR: C/PSEL,USA-NLabs 99,TR-73-1B-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (♦TEST EQUIPMENT, DESIGN); (♦ANTHROPOMETRY,  
♦BODY ARMOR), ARMY RESEARCH, MEASUREMENT, HUMAN BODY,  
LOADS(FORCES), PRESSURE, DETECTORS, PRESSURE GAGES (U)

IN A CONTINUING EFFORT TO REDUCE DISCOMFORT IN THE WEARING OF CERAMIC BODY ARMOR, THE MEASUREMENT OF STRESSES UPON THE BODY HAS BEEN AN IMPORTANT APPROACH TOWARD ACHIEVING THE BEST POSSIBLE CONFIGURATION FOR RIGID PLATES. A DEVICE FOR MAKING SUCH MEASUREMENTS HAS BEEN DEVELOPED WHICH IS CAPABLE OF SIMULTANEOUSLY MEASURING AND DISPLAYING PRESSURE, PRESSURE CHANGES, LOAD MAGNITUDE AND THE DISTRIBUTION OF FORCES TRANSMITTED TO THE TORSO BY AIRCREW AND INFANTRY ARMOR, LOAD CARRYING EQUIPMENT, COMBAT CLOTHING, SEAT CONFIGURATIONS AND SEAT RESTRAINT AND PARACHUTE HARNESSSES. THE SYSTEM CONSISTS OF A SENSOR VEST INCORPORATING 248 MINIATURE SENSORS. A THREE-DIMENSIONAL ANATOMICAL UNIT VISUALLY DISPLAYS LOAD MAGNITUDES AND DISTRIBUTION OF FORCES TRANSMITTED TO THE TORSO BY LIGHTS WHICH CHANGE COLOR DEPENDING UPON THE LOAD. (AUTHOR MODIFIED ABSTRACT) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-759 493 14/4 5/5  
HUMAN ENGINEERING LAB ABERDEEN PROVING GROUND MD

HUMAN FACTOR EVALUATION OF THE USMC M1955  
ARMORED VEST AND THE PROPOSED TITANIUM  
NYLON IMPROVED CONVENTIONAL MUNITIONS  
PROTECTIVE ARMORED VEST (48 PLATE). (U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.,  
MAR 73 77P SCHEETZ, HAYDEN A. (CORONA,  
BERNARD M. ELLIS, PAUL H. JONES, R. DOUGLAS  
IRANDELL, R. BRADLEY;  
REPT. NO. HEL-TM-8-73

UNCLASSIFIED REPORT

DESCRIPTORS: (•BODY ARMOR, •HUMAN FACTORS ENGINEERING),  
TITANIUM, ANTHROPOMETRY, NYLON, PERFORMANCE(HUMAN),  
ADAPTATION(PHYSIOLOGY), FIRING TESTS(ORDNANCE),  
PERFORMANCE(HUMAN), ARMY EQUIPMENT (U)

A HUMAN FACTORS EVALUATION OF THE ARMY  
SIMPLIFIED 48-PLATE TITANIUM/NYLON ARMORED  
VEST AND THE M1955 USMC DORON ARMORED  
VEST WAS CONDUCTED BY THE U.S. ARMY HUMAN  
ENGINEERING LABORATORY. THE VESTS WERE  
COMPARED AS TO PHYSICAL CHARACTERISTICS,  
ANTHROPOMETRIC MEASUREMENTS, VEST MOVEMENT AND STATIC  
EXERCISE, EMPLOYMENT OF SMALL ARMS BY TROOPS EQUIPPED  
WITH THE VESTS, AND USER ACCEPTANCE. THE RESULTS  
YIELDED MANY POINTS OF CONTRAST BETWEEN VESTS, BUT NO  
OVERRIDING SUPERIORITY OF EITHER VEST WAS NOTED.  
RECOMMENDATIONS ARE MADE TO IMPROVE THE QUALITIES  
OF THE SIMPLIFIED 48-PLATE TITANIUM/NYLON  
CONFIGURATION, BASED ON THE CONCLUSION THAT A GREATER  
POTENTIAL FOR FURTHER DEVELOPMENT IS SEEN IN THE  
ARTICULATED CONFIGURATION. (AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-763 14.1 1974  
EDGEMOOR ARSENAL ABERDEEN PROVING GROUND MD

A SYSTEMS EFFECT STUDY ON THE EVALUATION OF  
LIGHTWEIGHT BODY ARMOR.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. DEC 72-SEP 72,  
JUN 73 34P SACCO, WILLIAM J. ISHEAR,  
RALPH E. ;  
REPT. NO. EA-TR-4729  
PROJ: DA-I-J-662713-DJ-4U, DA-I-T-062110-A-027

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BODY ARMOR, RELIABILITY), EFFECTIVENESS,  
PROTECTION, FRAGMENTATION, PENETRATION, TERMINAL

BALLISTICS, NUCLEAR PROGRAMMING, THORAX

(U)

IDENTIFIERS: EVALUATION

(U)

CONTENTS: FRAGMENT THREATS; THE FRAGMENT  
SIMULATOR; THE THORACIC DEFENSE SYSTEM; MEDICAL  
EVALUATION PHASE.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-765 423 11/8 19/4  
ALLIED CHEMICAL CORP PETERSBURG VA

EXPERIMENTAL NYLON 6 FOR PERSONNEL  
ARMOR.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,  
DEC 72 410 MAYER, RICHARD E.;  
CONTRACT: DAAG17-70-C-0029  
PROJ: DA-1-T-U62105-A-329  
TASK: 1-T-U62105-A-32902  
MONITOR: USA-NLABS TR-73-28-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (•BODY ARMOR, •NYLON), TERMINAL BALLISTICS,  
TEXTILES, TESTS, SPINNING(INDUSTRIAL PROCESSES).

PRODUCTION

(U)

IDENTIFIERS: NYLON 6

(U)

THE WORK WAS AN EFFORT TO DETERMINE WHETHER THE  
PERFORMANCE OF THE NEW TYPE NYLON 6 FOR PERSONNEL  
ARMOR COULD BE FURTHER OPTIMIZED BY VARIATIONS IN  
MOLECULAR WEIGHT, MOLECULAR WEIGHT DISTRIBUTION,  
ORIENTATION AND CRYSTALLINITY. THE RESULTS,  
ALTHOUGH NEGATIVE IN RESPECT TO THE GOALS OF LIGHT,  
NEVERTHELESS SHOW THAT AN INVESTIGATION OF  
FUNDAMENTALLY DIFFERENT TYPES OF FIBER IS NEEDED TO  
OBTAIN SIGNIFICANT IMPROVEMENTS IN TENACITY, WORK-TO-  
RUPTURE, AND ATTENDANT INCREASES IN IMPACT  
RESISTANCE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-766 246 19/4  
HUMAN ENGINEERING LAB ABERDEEN PROVING GROUND MD

A HUMAN FACTORS ENGINEERING ASSESSMENT OF  
AN ANATOMICALLY CONFORMING AIRCREW BODY  
ARMOR SYSTEM.

(U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.,  
JUN 73 90P CORONA, BERNARD M. JONES,  
R. DOUGLAS I  
REPT. NO. HEL-TM-9-73

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BODY ARMOR, FLIGHT CREWS), COMPATIBILITY,  
ARMY RESEARCH (U)

AN ANATOMICALLY CONFORMING, FOUR-SIZE, AIRCREW BODY  
ARMOR (ACBA) SYSTEM, DEVELOPED BY US ARMY  
NATICK LABORATORIES, WAS ASSESSED TO DETERMINE  
ITS COMPATIBILITY WITH ARMY AVIATOR BODY SIZES.  
FLIGHT TASK REQUIREMENTS AND AIRCREW STATION  
GEOMETRY. AS A BASE FOR ALL COMPARISONS THE  
STANDARD THREE-SIZE, AIRCREW BODY ARMOR (SBA)  
SYSTEM WAS USED. WHERE POSSIBLE AN ATTEMPT WAS  
MADE TO INTEGRATE AND UTILIZE ELEMENTS OF THE HEL  
ARMOR SYSTEM DEVELOPMENT/EVALUATION  
GUIDELINE, TM 18-69. THIRTY ENLISTED MEN AND  
SIX OFFICER PILOTS WERE USED AS SUBJECTS. AS A  
RESULT OF THIS HFE ASSESSMENT IT HAS BEEN  
DETERMINED THAT THE ACBA SYSTEM WAS NOT SUITABLE AS  
PROPOSED, THE SBA SYSTEM HAS SERIOUS SHORTCOMINGS,  
AND THE HEL TM 18-69 CANNOT BE UTILIZED FOR THE  
DEVELOPMENT OR EVALUATION OF BODY-WORN ARMOR SYSTEMS.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-815 561 19/4  
ARMY CONCEPT TEAM IN VIETNAM SAN FRANCISCO CALIF  
96243

BODY ARMOR.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 15 JAN-30 MAY 67,  
JUN 67 7P SPICELY, SAMUEL B.  
PROJ: ACTIV-ACL-24/67:

UNCLASSIFIED REPORT

DESCRIPTORS: (BODY ARMOR, ACCEPTABILITY), INFANTRY,  
CONFIGURATION, TEST EQUIPMENT, HUMAN FACTORS  
ENGINEERING, WEIGHT, PERFORMANCE(ENGINEERING),

VIETNAM

(U)

IDENTIFIERS: COMFORT

(U)

TROOP ACCEPTANCE DURABILITY, AND OPERATIONAL  
SUITABILITY OF ARMOR, INFANTRY SMALL ARMS,  
PROTECTIVE FRONT AND BACK WITH CARRIER, AND  
BODY ARMOR, FRAGMENTATION PROTECTIVE,  
LIGHTWEIGHT WERE DETERMINED IN VIETNAM. BODY  
ARMOR, FRAGMENTATION PROTECTIVE, LIGHTWEIGHT  
IS DURABLE BUT IS NOT ACCEPTABLE FOR WEAR BY FOOT  
MOBILE TROOPS WHILE ENGAGED IN SEARCH AND DESTROY  
OPERATIONS, PATROLLING, OR RECONNAISSANCE OPERATIONS.

ARMOR, INFANTRY SMALL ARMS, PROTECTIVE  
FRONT AND BACK WITH CARRIER IS DURABLE AND  
ACCEPTABLE FOR USE BY PERSONNEL ENGAGED IN CONVOY  
ESCORT DUTY, MOTORIZED PATROLS, AND SIMILAR  
FUNCTIONS. CONTINUED R AND D EMPHASIS SHOULD  
BE PLACED ON REDUCING THE WEIGHT OF BODY ARMOR.  
ARMOR INFANTRY SMALL ARMS, PROTECTIVE  
FRONT AND BACK WITH CARRIER, SHOULD BE MADE  
AVAILABLE FOR ISSUE TO TROOPS ENGAGED IN CONVOY  
ESCORT DUTY, MOTORIZED PATROLS, AND SIMILAR  
FUNCTIONS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAA14

AD-BIR 141 19/4  
ARMY INFANTRY BOARD FORT BENNING GA

SERVICE TEST OF LIGHTWEIGHT BODY ARMOR, BASIC VEST,  
T66-1. (U)

DESCRIPTIVE NOTE: FINAL TEST REPT. 6 JAN-6 MAY 67,  
JUN 67 63P DRYANT, JAMES A. ;  
REPT. NO. USAIB-3174  
PROJ: RDT/E-1A643303D54730, USATECOM-6-7-6510-02

UNCLASSIFIED REPORT

DESCRIPTIONS: (•BODY ARMOR, ACCEPTABILITY), HUMAN FACTORS ENGINEERING, PROTECTION, CLOTHING, ARMY PERSONNEL, QUALITY CONTROL, FAILURE, TEST METHODS, MOISTURE (U)

IDENTIFIERS: HUMAN FACTORS ENGINEERING, LINCLOE(LIGHTWEIGHT INDIVIDUAL COMBAT CLOTHING AND E, PARACHUTISTS (U)

THE SERVICE TEST OF LIGHTWEIGHT BODY ARMOR, BASIC VEST, T66-1, WAS CONDUCTED BY THE US ARMY INFANTRY BOARD FROM 6 JANUARY 1967 TO 6 MAY 1967. THE PURPOSE OF THE TEST WAS TO DETERMINE THE SUITABILITY OF THE T66-1 VEST FOR US ARMY USE; TO DETERMINE TO WHAT EXTENT THE T66-1 VEST MET THE REQUIREMENTS OF THE LINCLOE QMR; AND TO DETERMINE THE SUITABILITY OF THE T66-1 VEST FOR PARACHUTIST'S USE AND USE WITH LOWERING DEVICES. FOUR DEFICIENCIES AND THREE SHORTCOMINGS WERE FOUND. THE DEFICIENCIES WERE: LACK OF DURABILITY OF THE T66-1 VEST, ALL SIZES OF THE T66-1 VEST EXCEEDED THE WEIGHT LIMITATIONS SPECIFIED IN LINCLOE QMR; THE T66-1 VEST RESTRICTED HEAD AND BODY MOVEMENT AND BREATHING TO A GREATER DEGREE THAN THE STANDARD VEST AND CONSEQUENTLY FAILED TO IMPROVE, OVER THE STANDARD VEST, THE WEARER'S ABILITY TO PERFORM A COMBAT RELATED ACTIVITY; THE T66-1 VEST PREVENTED PARACHUTISTS FROM CHECKING THEIR ENTIRE CANOPIES FOR MALFUNCTION OR DAMAGE, THUS CREATING A SAFETY HAZARD TO PARACHUTISTS. THE SHORTCOMINGS WERE: THE INADEQUACY OF THE HAND GRENADES; INADEQUACY OF THE CLOSURE SYSTEM ON THE BELLows-TYPE BREAST POCKETS FOR KEEPING THE POCKETS CLOSED; AND OMISSION OF INSTRUCTIONS IN THE POMI FOR WASHING THE T66-1 VEST. THE US ARMY INFANTRY BOARD CONCLUDES THAT THE T66-1 VEST IS UNSUITABLE FOR US ARMY USE UNTIL CORRECTION OF THE DEFICIENCIES AND AS MANY SHORTCOMINGS AS PRACTICABLE.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-826 999 5/9 6/17 19/4  
ARMY CONCEPT TEAM IN VIETNAM SAN FRANCISCO CALIF 96384

AIRCREW PROTECTIVE ARMOR. (U)

DESCRIPTIVE NOTE: FINAL REPT. OCT-DEC 67,  
JAN 68 13P YOST,DEVERNE R.  
PROJ: ACTIV-ACA-55/67-I

UNCLASSIFIED REPORT

DESCRIPTORS: (+BODY ARMOR, FLIGHT CREWS), MILITARY  
REQUIREMENTS, EFFECTIVENESS, PROTECTIVE CLOTHING,  
CERAMIC MATERIALS, GLASS TEXTILES, DESIGN, NYLON (U)

THE PRESENT AIRCREW ARMOR WILL NOT CONTAIN THE  
BULLETP SPLASH NOR THE SPALL WHEN STRUCK BY A  
PROJECTILE. NATICK LABORATORY DESIGNED AND  
FABRICATED A NYLON FELT FILLED VEST TO CARRY THE  
CERAMIC, FIBER GLASS PLATES. NATICK LABORATORY  
TESTS CONFIRMED THE CREDIBILITY OF DESIGN. THE  
ARMY CONCEPT TEAM IN VIETNAM (ACTIV)  
EVALUATED THE ITEMS TO DETERMINE IF THE EQUIPMENT WAS  
COMFORTABLE AND WOULD NOT INTERFERE WITH PERFORMANCE  
OF CREW DUTIES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-828 984 1974 11/9  
ARMY GENERAL EQUIPMENT TEST ACTIVITY FORT LEE VA

ENGINEERING TEST OF LIGHTWEIGHT BODY ARMOR, BASIC  
VEST, T66-1. (U)

DESCRIPTIVE NOTE: FINAL REPT.,  
AUG 67 95P MANGUM, EDWIN W.  
PROJ: PDT/E-1-H-643303-D-547, USATECOM=876510  
TASK: 1-H-643303-D-54730, 87651001

UNCLASSIFIED REPORT

DESCRIPTORS: (BODY ARMOR, ACCEPTABILITY), SAFETY, HUMAN  
FACTORS ENGINEERING, FLAMMABILITY, QUESTIONNAIRES,  
NYLON, VISUAL INSPECTION, VENTILATION, BURNING RATE,  
WEAR RESISTANCE, ENVIRONMENTAL TESTS, RELIABILITY (U)  
IDENTIFIERS: HEAT, PROTECTION (U)

AN ENGINEERING TEST OF LIGHTWEIGHT BODY  
ARMOR, BASIC VEST, T66-1 WAS CONDUCTED FROM 9  
JANUARY THROUGH 30 JUNE 1967 TO DETERMINE THE  
TECHNICAL PERFORMANCE AND SAFETY CHARACTERISTICS OF  
THE T66-1 VEST IN CONSIDERATION OF ALL TECHNICAL  
CHARACTERISTICS FOR LIGHTWEIGHT BODY ARMOR IN  
THE QMR FOR A SYSTEM OF LIGHTWEIGHT INDIVIDUAL  
CLOTHING AND EQUIPMENT (LINCOLN) WITH THE  
EXCEPTION OF THOSE RELATED TO BALLISTICS LIMITS,  
MAINTENANCE, AND TRAINING DEVICES. IT IS  
RECOMMENDED THAT THE LIGHTWEIGHT BODY ARMOR,  
BASIC VEST, T66-1 BE MODIFIED TO INCLUDE A  
NONFLAMMABLE BINDER IN THE NYLON FELT FILLER, TO  
PROVIDE INCREASED VENTILATION, AND TO ELIMINATE  
INTERFERENCE WITH POSITIONING AND FIRING THE RIFLE. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-867 357 19/4 6/17  
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND  
MD

ARCTIC ENVIRONMENTAL TEST OF BODY ARMOR AND  
HELMETS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON MATERIEL TEST PROCEDURE.  
NOV 69 16P  
REPT. NO. MTP-10-4-009  
PROJ: AMCR-310-6

UNCLASSIFIED REPORT

DESCRIPTORS: (+HELMETS, COLD WEATHER TESTS), (+BODY  
ARMOR, COLD WEATHER TESTS), SAFETY, HUMAN FACTORS  
ENGINEERING, DROP TESTS, MAINTAINABILITY, PHYSICAL  
PROPERTIES, ARMY RESEARCH, ARCTIC REGIONS (U)

THE REPORT DESCRIBES TEST METHODS AND TECHNIQUES  
FOR EVALUATING THE PERFORMANCE AND CHARACTERISTICS OF  
BODY ARMOR AND HELMETS UNDER ARCTIC WINTER  
ENVIRONMENTAL CONDITIONS, RELATIVE TO THE  
REQUIREMENTS EXPRESSED IN QUALITATIVE MATERIEL  
REQUIREMENTS, SMALL DEVELOPMENT REQUIREMENTS,  
OR OTHER APPLICABLE DOCUMENTATION CONTAINING DESIGN  
REQUIREMENTS. THE END OBJECTIVE OF TESTING IS TO  
ASCERTAIN WHETHER THE TEST ITEM IS SUITABLE FOR  
MILITARY SERVICE USE UNDER ARCTIC WINTER  
ENVIRONMENTAL CONDITIONS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZAAI4

AD-872 651 1974 14/2  
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND  
MD

BODY ARMOR.

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON MATERIEL TEST PROCEDURE.  
JUN 70 24P  
REPT. NO. MTP-10-2-206  
PROJ: AMCR-310-6

UNCLASSIFIED REPORT

DESCRIPTORS: \*BODY ARMOR; TEST METHODS, ARMY EQUIPMENT, STANDARDS; TEST EQUIPMENT, RELIABILITY, ENVIRONMENTAL TESTS, TRANSPORTATION, MAINTENANCE, LIFE EXPECTANCY, SAFETY, HUMAN FACTORS ENGINEERING, QUALITY CONTROL (U)

IDENTIFIERS: \*COMMON ENGINEERING TEST PROCEDURES, EVALUATION, LIGHTWEIGHT INDIVIDUAL CLOTHING AND EQUIPMENT, LINCOLN(LIGHTWEIGHT INDIVIDUAL CLOTHING AND EQUIPMENT) (U)

THE ENGINEERING TEST PROCEDURE DESCRIBES TEST METHODS AND TECHNIQUES FOR EVALUATING THE TECHNICAL PERFORMANCE AND CHARACTERISTICS OF BODY ARMOR, AND FOR DETERMINING ITS SUITABILITY TO BE SUBJECTED TO FURTHER TEST FOR SERVICE USE BY THE U. S. ARMY. THE EVALUATION IS RELATED TO CRITERIA EXPRESSED IN APPLICABLE QUALITATIVE MATERIEL REQUIREMENTS (QMR), SMALL DEVELOPMENT REQUIREMENTS (SDR), TECHNICAL CHARACTERISTICS (TC), OR OTHER APPROPRIATE DESIGN REQUIREMENTS AND SPECIFICATIONS. (U)

UNCLASSIFIED

CORPORATE AUTHOR - MONITORING AGENCY

\*ADVISORY GROUP FOR AEROSPACE RESEARCH  
AND DEVELOPMENT PARIS (FRANCE)

BODY ARMOR, BASIC VEST, T66-1.  
AD-828 884

\* \* \*  
AGARD-CP-41  
PATTERN RECOGNITION. BODY  
ARMOUR AND AIRCREW EQUIPMENT  
ASSEMBLIES. CURRENT SPACE MEDICAL  
PROBLEMS. AEROMEDICAL EVACUATION.  
AD-691 092

\*ARMY INFANTRY BOARD FORT BENNING GA  
\* \* \*  
USAIB-3174  
SERVICE TEST OF LIGHTWEIGHT  
BODY ARMOR, BASIC VEST, T66-1.  
AD-818 141

\*AEROJET-GENERAL CORP AZ/USA CALIF

\*ARMY NATICK LABS MASS

\* \* \*  
DEVELOPMENT OF PLASTIC MATERIAL  
FOR PERSONNEL ARMOR  
AD-052 243

\* \* \*  
USA-NLABS-72-3-CE  
FOAM FLOTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR.  
AD-731 000

\*ALLIED CHEMICAL CORP PETERSBURG VA

\* \* \*  
USA-NLABS-TR-68-4-PR  
HUMAN FACTORS EVALUATION OF  
BODY-SUPPORTED AIRCREWMAN'S  
BUTTOCKS AND CROTCH PROTECTIVE  
UNITS: (COMPARISONS OF TWO HEIGHTS  
OF CROTCH PROTECTOR AND THREE  
SUSPENSION SYSTEMS).  
AD-658 034

\*ARMY CONCEPT TEAM IN VIETNAM SAN  
FRANCISCO CALIF 96243

\* \* \*  
USA-NLABS-TR-68-57-CM  
CRASHWORTHINESS OF AIRCREW  
PROTECTIVE ARMOR.  
AD-672 504

\* \* \*  
BODY ARMOR.  
AD-815 561

\*ARMY CONCEPT TEAM IN VIETNAM SAN  
FRANCISCO CALIF 96384

\* \* \*  
USA-NLABS-TR-69-43-CE  
BODY ARMOR FOR AIRCREWMEN.  
AD-688 122

\* \* \*  
AIRCREW PROTECTIVE ARMOR.  
AD-826 999

\* \* \*  
USA-NLABS-TR-69-49-CE  
A STUDY OF FORCES CAUSED BY  
HEAD IMPACT ON AIRCREW PERSONNEL  
ARMOR UNDER SIMULATED CRASH  
CONDITIONS.  
AD-685 838

\*ARMY FOREIGN SCIENCE AND TECHNOLOGY  
CENTER CHARLOTTESVILLE VA

\* \* \*  
USA-NLABS-TR-69-61-CE  
CONSTRUCTION OF BALLISTIC  
MATERIAL SAMPLES FOR AIRCREW ARMOR  
SYSTEMS.  
AD-691 739

\*ARMY GENERAL EQUIPMENT TEST ACTIVITY  
FORT LEE VA

\* \* \*  
USA-NLABS-TR-69-79-PR  
EVALUATION OF ARMY AIRCREW  
PROTECTIVE ARMOR IN VIETNAM.

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ARM-ARM

AD-696 481

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USA-NLABS-TR-70-13-CE  
A STUDY OF FELTS FOR PERSONAL  
ARMOR.

AD-695 644

\* \* \*

USA-NLABS-TR-70-32-CE  
A REVIEW OF THE DEVELOPMENT OF  
BALLISTIC NEEDLE-PUNCHED FELTS.  
AD-707 918

\* \* \*

USA-NLABS-TR-70-51-CE.  
ADVANCED AIRCREW ARMOR  
SUSPENSION SYSTEMS.  
AD-713 016

\* \* \*

USA-NLABS-TR-70-65-CE  
DESIGN, DEVELOPMENT AND  
FABRICATION OF A PERSONNEL ARMOR  
LOAD PROFILE ANALYZER.  
AD-711 876

\* \* \*

USA-NLABS-TR-71-30-CE  
A HISTORY OF THE DEVELOPMENT OF  
AN ARMOR ENSEMBLE FOR MINE  
CLEARANCE PERSONNEL.  
AD-729 353

\* \* \*

USA-NLABS-TR-71-47-CE  
EXPERIMENTAL ORGANIC FIBER  
MATERIALS FOR PERSONNEL ARMOR.  
AD-730 775

\* \* \*

USA-NLABS-TR-71-48-CE  
BICOMPONENT AND BICONSTITUENT  
FIBERS IN BALLISTIC FABRIC FOR  
PERSONNEL ARMOR.  
AD-726 918

\* \* \*

USA-NLABS-TR-73-9-CE  
BALLISTIC AND SPALL TESTS FOR  
AIRCREW BODY ARMOR.  
AD-756 367

\* \* \*

USA-NLABS-TR-73-13-PR  
SOME EFFECTS OF BODY ARMOR ON  
MOTOR PERFORMANCE. PART I.  
EFFECTS OF STANDARD (135 PLATE) AND  
EXPERIMENTAL (48 PLATE) TITANIUM-  
NYLON BODY ARMOR ON MOTOR

PERFORMANCE. PART II. ARMOR AND  
LOAD INDUCED PATTERNS OF PRESSURE  
ON THE TORSO DURING MOTOR  
PERFORMANCE.

AD-753 937

\* \* \*

USA-NLABS-TR-73-18-CE  
DESIGN AND DEVELOPMENT OF A  
FULL-SCALE ANATOMICAL LOAD  
DISTRIBUTION ANALYZER.  
AD-758 918

\* \* \*

USA-NLABS-TR-73-28-CE  
EXPERIMENTAL NYLON 6 FOR  
PERSONNEL ARMOR.  
AD-765 423

\*ARMY NATICK LABS MASS PIONEERING  
RESEARCH DIV

\* \* \*

EPR-14  
HUMAN FACTORS EVALUATION OF  
BODY-SUPPORTED AIRCREWMAN'S  
BUTTOCKS AND CROTCH PROTECTIVE  
UNITS: (COMPARISONS OF TWO HEIGHTS  
OF CROTCH PROTECTOR AND THREE  
SUSPENSION SYSTEMS).  
(USA-NLABS-TR-68-4-PR)  
AD-658 034

\*ARMY NATICK LABS MASS CLOTHING AND  
ORGANIC MATERIALS LAB

\* \* \*

C/OM-47  
CRASHWORTHINESS OF AIRCREW  
PROTECTIVE ARMOR.  
AD-672 504

\*ARMY NATICK LABS MASS CLOTHING AND  
PERSONAL LIFE SUPPORT EQUIPMENT LAB

\* \* \*

C/ED-50  
BODY ARMOR FOR AIRCREWMEN.  
(USA-NLABS-TR-69-43-CE)  
AD-688 122

\* \* \*

C/PLSEL-59  
A STUDY OF FORCES CAUSED BY  
HEAD IMPACT ON AIRCREW PERSONNEL  
ARMOR UNDER SIMULATED CRASH  
CONDITIONS.

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AD-685 838

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C/PLSEL-62  
CONSTRUCTION OF BALLISTIC  
MATERIAL SAMPLES FOR AIRCREW ARMOR  
SYSTEMS.

AD-691 739

\* \* \*

C/PLSEL-74  
ADVANCED AIRCREW ARMOR  
SUSPENSION SYSTEMS.

AD-713 016

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C/PLSEL-75  
DESIGN, DEVELOPMENT AND  
FABRICATION OF A PERSONNEL ARMOR  
LOAD PROFILE ANALYZER.

AD-711 876

\* \* \*

C/PLSEL-84  
A HISTORY OF THE DEVELOPMENT OF  
AN ARMOR ENSEMBLE FOR MINE  
CLEARANCE PERSONNEL.  
(USA-NLABS-TR-71-30-CE)

AD-729 353

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C/PLSEL-87  
FOAM FLOTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR.

AD-731 000

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C/PLSEL-98  
BALLISTIC AND SPALL TESTS FOR  
AIRCREW BODY ARMOR.  
(USA-NLABS-TR-73-9-CE)

AD-756 367

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C/PLSEL-TS-164  
A STUDY OF FELTS FOR PERSONAL  
ARMOR.

AD-695 644

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C/PLSEL-TS-173  
BICOMPONENT AND BICONSTITUENT  
FIBERS IN BALLISTIC FABRIC FOR  
PERSONNEL ARMOR.

AD-726 918

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C/PLSEL-TS-177  
EXPERIMENTAL ORGANIC FIBER  
MATERIALS FOR PERSONNEL ARMOR.

AD-730 775

\* \* \*

C/PSL-TS-167  
A REVIEW OF THE DEVELOPMENT OF  
BALLISTIC NEEDLE-PUNCHED FELTS.  
(USA-NLABS-TR-70-37-CE)

AD-707 918

\*ARMY NATICK LABS MASS PIONEERING  
RESEARCH LAB

\* \* \*

FPT-9  
EVALUATION OF ARMY AIRCREW  
PROTECTIVE ARMOR IN VIETNAM.  
(USA-NLABS-TR-69-79-PR)

AD-696 481

\*ARMY TEST AND EVALUATION COMMAND  
ABERDEEN PROVING GROUND MD

\* \* \*

MTP-10-2-206  
BODY ARMOR.

AD-872 651

\* \* \*

MTP-10-2-506  
BALLISTIC TESTING OF PERSONNEL  
ARMOR MATERIALS.

AD-719 212

\* \* \*

MTP-10-4-009  
ARCTIC ENVIRONMENTAL TEST OF  
BODY ARMOR AND HELMETS.

AD-867 357

\* \* \*

TOP-10-3-022  
BODY ARMOR.

AD-751 155

\*AVIATION (M L) CO LTD (GT BRIT)

\* \* \*

PHYSIOLOGICAL COSTS OF BODY  
ARMOR.

AD-687 953

\*AVIATION SAFETY ENGINEERING AND  
RESEARCH PHOENIX ARIZ

\* \* \*

CRASHWORTHINESS OF AIRCREW  
PROTECTIVE ARMOR.  
(USA-NLABS-TR-68-57-CM)

AD-672 504

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\*CHEMICAL CORPS MEDICAL LABS ARMY  
CHEMICAL CENTER MD

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RR257  
WOUND BALLISTICS, WOUNDED IN  
ACTION, KOREA. 6 AUGUST 1953-19  
AUGUST 1953  
AD-029 480

\* \* \*

RR300  
A COMPARATIVE BALLISTIC STUDY  
OF THE STANDARD U.S. ARMY VEST.  
M1952-A, AND OF THE CANADIAN ARMOR  
VEST, X53  
AD-039 470

\*DYNAMIC SCIENCE PHOENIX ARIZ AVSER  
FACILITY

\* \* \*

A STUDY OF FORCES CAUSED BY  
HEAD IMPACT ON AIRCREW PERSONNEL  
ARMOR UNDER SIMULATED CRASH  
CONDITIONS.  
(USA-NLABS-TR-69-49-CE)  
AD-685 838

\*EDGEWOOD ARSENAL ABERDEEN PROVING  
GROUND MD

\* \* \*

EA-TR-4729  
A SYSTEMS EFFECT STUDY ON THE  
EVALUATION OF LIGHTWEIGHT BODY  
ARMOR.  
AD-763 165

\*HUMAN ENGINEERING LAB ABERDEEN  
PROVING GROUND MD

\* \* \*

HEL-TM-8-73  
HUMAN FACTOR EVALUATION OF THE  
USMC M1955 ARMORED VEST AND THE  
PROPOSED TITANIUM NYLON IMPROVED  
CONVENTIONAL MUNITIONS PROTECTIVE  
ARMORED VEST (46 PLATE).

AD-759 493

\* \* \*

HEL-TM-9-73  
A HUMAN FACTORS ENGINEERING  
ASSESSMENT OF AN ANATOMICALLY  
CONFORMING AIRCREW BODY ARMOR  
SYSTEM.  
AD-766 296

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HEL-TN-14-72  
EVALUATION OF RIFLE-FIRING  
BEHAVIOR OF TRROOPS EQUIPPED WITH  
BODY ARMOR: A PILOT STUDY.  
AD-752 903

\*IIT RESEARCH INST CHICAGO ILL

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CONSTRUCTION OF BALLISTIC  
MATERIAL SAMPLES FOR AIRCREW ARMOR  
SYSTEMS.  
(USA-NLABS-TR-69-61-CE)  
AD-691 739

\* \* \*

DESIGN, DEVELOPMENT AND  
FABRICATION OF A PERSONNEL ARMOR  
LOAD PROFILE ANALYZER.  
(USA-NLABS-TR-70-65-CE)  
AD-711 876

\* \* \*

ADVANCED AIRCREW ARMOR  
SUSPENSION SYSTEMS.  
(USA-NLABS-TR-70-51-CE)  
AD-713 016

\* \* \*

DESIGN AND DEVELOPMENT OF A  
FULL-SCALE ANATOMICAL LOAD  
DISTRIBUTION ANALYZER.  
AD-758 918

\*MARINE CORPS LANDING FORCE  
DEVELOPMENT CENTER QUANTICO VA

\* \* \*

T 1041  
BODY ARMOR  
AD-037 068

\* \* \*

T 1041 1  
ARMORED VEST, MODIFIED, EX 53-  
1, STUDY, EVALUATION AND FIELD TEST  
OF  
AD-035 448

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MEL-QUA

\*MELLON INST PITTSBURGH PA

\* \* \*

BALLISTIC PROTECTIVE BUOYANT  
MATERIALS  
AD-259 057

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BALLISTIC PROTECTIVE BUOYANT  
MATERIALS  
AD-266 054

\* \* \*

BALLISTIC PROTECTIVE BUOYANT  
MATERIALS  
AD-269 577

\* \* \*

BALLISTIC PROTECTIVE BUOYANT  
MATERIALS  
AD-276 256

\*MONSANTO RESEARCH CORP DAYTON OHIO

\* \* \*

FOAM FLOTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR.  
(USA-NLABS-72-3-CE)  
AD-731 000

\*MONSANTO RESEARCH CORP DURHAM N C

\* \* \*

EXPERIMENTAL ORGANIC FIBER  
MATERIALS FOR PERSONNEL ARMOR.  
(USA-NLABS-TR-71-47-CE)  
AD-730 775

\*NAVAL MEDICAL FIELD RESEARCH LAB CAMP  
LEJEUNE N C

\* \* \*

THE EFFECT OF SIMULATED  
TROPICAL CLIMATE ON THE PERFORMANCE  
OF MARINE CORPS PERSONNEL WEARING  
AN INTEGRATED BODY ARMOR-LOAD  
CARRYING SYSTEM (BALCS)  
AD-258 296

\* \* \*

THE EFFECTS OF TWO TYPES OF  
BODY ARMOR ON BODY TEMPERATURE.  
AD-624 738

\* \* \*

BODY ARMOR IN A HOT HUMID  
ENVIRONMENT. PART I. STUDIES IN  
UNACCLIMATIZED MEN.  
AD-676 689

\* \* \*

BODY ARMOR IN A HOT HUMID  
ENVIRONMENT. PART II. STUDIES IN  
HEAT ACCLIMATIZED MEN.  
AD-682 689

\*NAVY CLOTHING AND TEXTILE RESEARCH  
UNIT NATICK MASS

\* \* \*

2-72  
THE DEVELOPMENT OF A NAVY,  
BUOYANT, ANTI-FRAGMENT, BULLETPROOF  
VEST: PROTECTION AGAINST LOW-  
VELOCITY FRAGMENTS, SECONDARY  
(SPALL) FRAGMENT DAMAGE, AND 30-  
CALIBER-BALL PROJECTILES.  
AD-752 792

\* \* \*

TR-105  
THE DEVELOPMENT OF A NAVY,  
BUOYANT, ANTI-FRAGMENT, BULLETPROOF  
VEST: PROTECTION AGAINST LOW-  
VELOCITY FRAGMENTS, SECONDARY  
(SPALL) FRAGMENT DAMAGE, AND 30-  
CALIBER-BALL PROJECTILES.  
AD-752 792

\*OFFICE OF THE DIRECTOR OF DEFENSE  
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D C

\* \* \*

SYMPOSIUM ON PERSONNEL ARMOR  
HELD AT THE U. S. NAVAL RESEARCH  
LABORATORY OCTOBER 4-5, 1961 VOLUME  
I  
AD-273 876

\*QUARTERMASTER CORPS WASHINGTON D C

\* \* \*

A SET OF ANGLES OF OBLIQUITY  
FOR USE IN ASSESSING BODY ARMOR  
AD-255 237

\*QUARTERMASTER RESEARCH AND  
ENGINEERING COMMAND NATICK MASS

\* \* \*

PHYSIOLOGICAL RESPONSE CHANGES  
OF MEN ATTRIBUTABLE TO BODY ARMOR,  
SUN, AND WORK IN A NATURAL DESERT  
ENVIRONMENT (INCLUDING NEGRO-WHITE  
DIFFERENCES)  
AD-262 076

0-5  
UNCLASSIFIED

/ZAAI4

UNCLASSIFIED

TEX-WAT

\* \* \*

EPB-208  
ENERGY COST OF WEARING ARMORED  
VESTS AND CARRYING PACK LOADS ON  
TREADMILL, LEVEL COURSE, AND  
MOUNTAIN SLOPES  
AD-021 004

\*TEXTILE RESEARCH INST PRINCETON N J

\* \* \*

A STUDY OF FELTS FOR PERSONAL  
ARMOR.  
(USA-NLABS-TR-70-13-CE)  
AD-695 644

\*UNIROYAL INC WAYNE N J

\* \* \*

BICOMPONENT AND BICONSTITUENT  
FIBERS IN BALLISTIC FABRIC FOR  
PERSONNEL ARMOR.  
(USA-NLABS-TR-71-48-CE)  
AD-726 918

\*UNIVERSITY OF MANCHESTER INST OF  
SCIENCE AND TECHNOLOGY (ENGLAND)

\* \* \*

RESEARCH ON ENERGY ABSORPTION  
BY NONWOVEN FABRICS.  
AD-737 725

\*WATERTOWN ARSENAL LABS MASS

\* \* \*

WAL-710/1014  
BALLISTIC EVALUATION OF ARMORED  
VESTS EMPLOYING NYLON, DORON, AND  
MANGANESE STEEL AS ARMOR VEST.  
ARMCR, T52-1 VEST, ARMORED, M1951  
SPOONER VEST  
AD-029 020

0-6

UNCLASSIFIED

/ZAAI4

UNCLASSIFIED

SUBJECT INDEX

•AERIAL GUNNERY  
PROTECTION  
BODY ARMOR FOR AIRCREWMEM.♦  
AD-684 172

•AERIAL WARFARE  
VIETNAM  
EVALUATION OF ARMY AIRCREW  
PROTECTIVE ARMOR IN VIETNAM.♦  
AD-694 491

•AEROSPACE MEDICINE  
SYMPOSIA  
PATTERN RECOGNITION. BODY  
ARMOUR AND AIRCREW EQUIPMENT  
ASSEMBLIES. CURRENT SPACE MEDICAL  
PROBLEMS. AEROMEDICAL EVACUATION.♦  
AD-691 092

•ANTHROPOOMETRY  
BODY ARMOR  
DESIGN AND DEVELOPMENT OF A FULL-  
SCALE ANATOMICAL LOAD DISTRIBUTION  
ANALYZER.♦  
AD-759 914

•ARMOR  
BALLISTIC PROTECTIVE BUOYANT  
MATERIALS.♦  
AD-759 057

•ARMY PERSONNEL  
PERFORMANCE(HUMAN)  
EVALUATION OF RIFLE-FIRING  
BEHAVIOR OF TROOPS EQUIPPED WITH  
BODY ARMOR: A PILOT STUDY.♦  
AD-752 903

•AVIATION ACCIDENTS  
FORCE(MECHANICS)  
A STUDY OF FORCES CAUSED BY HEAD  
IMPACT ON AIRCREW PERSONNEL ARMOR  
UNDER SIMULATED CRASH CONDITIONS.♦  
AD-685 032

•AVIATION PERSONNEL  
BODY ARMOR  
HUMAN FACTORS EVALUATION OF BODY-  
SUPPORTED AIRCREWMAN'S BUTTOCKS AND  
CROTCH PROTECTIVE UNITS:  
COMPARISON OF TWO HEIGHTS OF  
CROTCH PROTECTOR AND THREE  
SUSPENSION SYSTEMS.♦  
AD-658 034

•BALLISTICS  
SOUTH KOREA  
WOUND BALLISTICS, WOUNDED IN  
ACTION, KOREA, 6 AUGUST 1953-19  
AUGUST 1953.♦  
AD-029 480

•BODY ARMOR  
BALLISTIC EVALUATION OF ARMORED  
VESTS EMPLOYING NYLON, DURON, AND  
MANGANESE STEEL AS ARMOR VEST,  
ARMOR, T52-1 VEST, ARMORED, M1951  
SPOONER VEST.♦  
AD-029 020  
ARMORED VEST, MODIFIED, EX 53-1,  
STUDY, EVALUATION AND FIELD TEST  
OF.♦  
AD-035 448  
A COMPARATIVE BALLISTIC STUDY OF  
THE STANDARD U.S. ARMY VEST, M1952-  
A, AND OF THE CANADIAN ARMOR VEST,  
X53.♦  
AD-039 470  
DEVELOPMENT OF PLASTIC MATERIAL  
FOR PERSONNEL ARMOR.♦  
AD-052 243

DEVELOPMENT OF PLASTIC MATERIAL  
FOR PERSONNEL ARMOR.♦  
AD-069 734  
A SET OF ANGLES OF OBLIQUITY FOR  
USE IN ASSESSING BODY ARMOR.♦  
AD-255 237  
THE EFFECT OF SIMULATED TROPICAL  
CLIMATE ON THE PERFORMANCE OF  
MARINE CORPS PERSONNEL WEARING AN  
INTEGRATED BODY ARMOR-LOAD CARRYING  
SYSTEM (BALCS).♦  
AD-258 296  
BALLISTIC PROTECTIVE BUOYANT  
MATERIALS.♦  
AD-259 057  
PHYSIOLOGICAL RESPONSE CHANGES  
OF MEN ATTRIBUTABLE TO BODY ARMOR.

D-1  
UNCLASSIFIED

/73614

UNCLASSIFIED

SIU-NOD

SUM, AND WORK IN A NATURAL DESERT ENVIRONMENT (INCLUDING NEGRO-WHITE DIFFERENCES).  
AD-262 070

BALLISTIC PROTECTIVE BUOYANT MATERIALS.  
AD-266 054

BALLISTIC PROTECTIVE BUOYANT MATERIALS.  
AD-274 577

SYMPOSIUM ON PERSONNEL ARMOR HELD AT THE U. S. NAVAL RESEARCH LABORATORY OCTOBER 4-5, 1961 VOLUME 1.  
AD-273 070

BALLISTIC PROTECTIVE BUOYANT MATERIALS: EFFECT OF FIBER CRIMP ON PENETRATION. BALLISTICS U. DACHON AND ACHILIAN CARDED BATTIS; CRIMPED FIBERS WERE SUPERIOR TO STRAIGHT OR UNCRIMPED FIBERS IN PREVENTING PASSAGE OF FRAGMENT SIMULATORS.  
AD-274 250

ACCEPTABILITY

BODY ARMOR.  
AF-815 561

SERVICE TEST OF LIGHTWEIGHT BODY ARMOR, BASIC VEST, T66-1.  
AU-118 141

ENGINEERING TEST OF LIGHTWEIGHT BODY ARMOR, BASIC VEST, T66-1.  
AD-826 884

ANTHROPOMETRY

DESIGN AND DEVELOPMENT OF A FULL-SCALE ANATOMICAL LOAD DISTRIBUTION ANALYZER.  
AD-756 913

ARMY PERSONNEL

EVALUATION OF RIFLE-FIRING BEHAVIOR OF TROOPS EQUIPPED WITH BODY ARMOR: A PILOT STUDY.  
AL-747 403

BODY TEMPERATURE

EFFECTS OF TWO TYPES OF BODY ARMOR ON BODY TEMPERATURE.  
AD-624 738

COLD WEATHER TESTS

ARCTIC ENVIRONMENTAL TEST OF BODY ARMOR AND HELMETS.  
AD-867 357

COMPATIBILITY

EVALUATION OF ARMY AIRCREW PROTECTIVE ARMOR IN VIETNAM.  
AD-696 481

COMPOSITE MATERIALS

RESEARCH ON ENERGY ABSORPTION BY NONWOVEN FABRICS.  
AD-737 725

DESIGN

THE DEVELOPMENT OF A NAVY, BUOYANT, ANTI-FRAGMENT, BULLETPROOF VEST: PROTECTION AGAINST LOW-VELOCITY FRAGMENTS, SECONDARY (SPALL) FRAGMENT DAMAGE, AND 30-CALIBER-BALL PROJECTILES.  
AD-752 792

DETECTORS

DESIGN, DEVELOPMENT AND FABRICATION OF A PERSONNEL ARMOR LOAD PROFILE ANALYZER.  
AD-711 876

FATIGUE(PHYSIOLOGY)

ENERGY COST OF WEARING ARMORED VESTS AND CARRYING PACK LOADS ON TREADMILL, LEVEL COURSE, AND MOUNTAIN SLOPES.  
AD-021 004

FIBERS(SYNTHETIC)

EXPERIMENTAL ORGANIC FIBER MATERIALS FOR PERSONNEL ARMOR.  
AD-730 775

FLIGHT CREWS

CRASHWORTHINESS OF AIRCREW PROTECTIVE ARMOR.  
AD-672 504

BODY ARMOR FOR AIRCREWMEMEN.  
AD-688 122

CONSTRUCTION OF BALLISTIC MATERIAL SAMPLES FOR AIRCREW ARMOR SYSTEMS.  
ZAA14

D-2  
UNCLASSIFIED

UNCLASSIFIED

STU-WOU

AL-691 739  
A HUMAN FACTORS ENGINEERING ASSESSMENT OF AN ANATOMICALLY CONFORMING AIRCREW BODY ARMOR SYSTEM.  
AD-766 296  
AIRCREW PROTECTIVE ARMOR.  
AD-826 494

FLOTATION

FOAM FLOTATION SYSTEMS FOR PERSONNEL WEARING BODY ARMOR.  
AD-731 000

HISTORY

KNIGHTS OF THE TWENTIETH CENTURY - TRANSLATION.  
AU-719 551

HUMAN FACTORS ENGINEERING

HUMAN FACTORS EVALUATION OF BODY-SUPPORTED AIRCREWMAN'S BUTTOCKS AND CROTCH PROTECTIVE UNITS; (COMPARISONS OF TWO HEIGHTS OF CROTCH PROTECTOR AND THREE SUSPENSION SYSTEMS).  
AD-65F 334

HUMAN FACTOR EVALUATION OF THE USMC M1955 ARMORED VEST AND THE PROPOSED TITANIUM NYLON IMPROVED CONVENTIONAL MUNITIONS PROTECTIVE AIRCREW VEST (48 PLATE).  
AD-759 493

IMPACT TESTS

A STUDY OF FORCES CAUSED BY HEAD IMPACT ON AIRCRAFT PERSONNEL ARMOR UNDER SIMULATED CRASH CONDITIONS.  
AD-665 038

MINE CLEARANCE

A HISTORY OF THE DEVELOPMENT OF AN ARMOR ENSEMBLE FOR MINE CLEARANCE PERSONNEL.  
AD-729 353

NYLON

EXPERIMENTAL NYLON 6 FOR PERSONNEL ARMOR.  
AL-744 473

PERFORMANCE(HUMAN)

SOME EFFECTS OF BODY ARMOR ON MOTOR PERFORMANCE. PART I. EFFECTS OF STANDARD (135 PLATE) AND EXPERIMENTAL (48 PLATE) TITANIUM-NYLON BODY ARMOR ON MOTOR PERFORMANCE. PART II. ARMOR AND LOAD INDUCED PATTERNS OF PRESSURE ON THE TORSO DURING MOTOR PERFORMANCE.  
AD-753 937

PHYSIOLOGY

REPRINT: PHYSIOLOGICAL COSTS OF BODY ARMOR.  
AD-687 953

RELIABILITY

A SYSTEMS EFFECT STUDY ON THE EVALUATION OF LIGHTWEIGHT BODY ARMOR.  
AD-763 165

SUSPENSION DEVICES

ADVANCED AIRCREW ARMOR SUSPENSION SYSTEMS.  
AD-713 016

SYMPOSIA

PATTERN RECOGNITION. BODY ARMOUR AND AIRCREW EQUIPMENT ASSEMBLIES. CURRENT SPACE MEDICAL PROBLEMS. AEROMEDICAL EVACUATION.  
AD-691 092

SYNTHETIC FIBERS

BICOMPONENT AND BICONSTITUENT FIBERS IN BALLISTIC FABRIC FOR PERSONNEL ARMOR.  
AD-726 918

TERMINAL BALLISTICS

BALLISTIC AND SPALL TESTS FOR AIRCREW BODY ARMOR.  
AD-756 367

TEST METHODS

BODY ARMOR.  
AD-037 068  
BALLISTIC TESTING OF PERSONNEL ARMOR MATERIALS.  
AD-756 367

0-1  
UNCLASSIFIED

/ZAA14

UNCLASSIFIED

REF ID: A6511

AD-714 412  
BODY ARMOR\*\*  
AD-751 155  
BODY ARMOR\*\*  
AD-877 551

TEXTILES

A STUDY OF FELTS FOR PERSONAL  
ARMOR\*\*  
AD-693 644  
A REVIEW OF THE DEVELOPMENT OF  
BALLISTIC NEEDLE-PUNCHED FELTS\*\*  
AD-707 918

TROPICAL TESTS

BODY ARMOR IN A HOT HUMID  
ENVIRONMENT. PART I. STUDIES IN  
UNACCLIMATIZED MEN\*\*  
AD-676 689  
BODY ARMOR IN A HOT HUMID  
ENVIRONMENT. PART II. STUDIES IN  
HEAT ACCLIMATIZED MEN\*\*  
AD-646 624

\*BODY TEMPERATURE

BODY ARMOR  
EFFECTS OF TWO TYPES OF BODY  
ARMOR ON BODY TEMPERATURE.  
AD-624 730

\*CERAMIC MATERIALS

BODY ARMOR  
CONSTRUCTION OF BALLISTIC  
MATERIAL SAMPLES FOR AIRCREW ARMOR  
SYSTEMS\*\*  
AD-671 134

\*CRASH INJURIES

FLIGHT CREWS  
CRASH AND HIKESS OF AIRCREW  
PROTECTIVE ARMOR\*\*  
AD-672 504

\*DACRON

BALLISTIC PROTECTIVE BUOYANT

MATERIALS\*\*  
AD-259 057  
BALLISTIC PROTECTIVE BUOYANT  
MATERIALS\*\*  
AD-269 577

\*DETECTORS

BODY ARMOR  
DESIGN, DEVELOPMENT AND  
FABRICATION OF A PERSONNEL ARMOR  
LOAD PROFILE ANALYZER\*\*  
AD-711 876

\*EVACUATION

SYMPOSIA  
PATTERN RECOGNITION. BODY  
ARMOUR AND AIRCREW EQUIPMENT  
ASSEMBLIES, CURRENT SPACE MEDICAL  
PROBLEMS. AEROMEDICAL EVACUATION\*\*  
AD-691 092

\*EXPANDED PLASTICS

FLOTATION  
FOAM FLOTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR\*\*  
AD-731 000

\*FATIGUE(PHYSIOLOGY)

MEASUREMENT  
ENERGY COST OF WEARING ARMORED  
VESTS AND CARRYING PACK LOADS ON  
TREADMILL, LEVEL COURSE, AND  
MOUNTAIN SLOPES\*\*  
AD-621 004

\*FIBERS (SYNTHETIC)

BALLISTIC PROTECTIVE BUOYANT  
MATERIALS\*\*  
AD-259 057  
BALLISTIC PROTECTIVE BUOYANT  
MATERIALS\*\*  
AD-266 054  
BALLISTIC PROTECTIVE BUOYANT  
MATERIALS; EFFECT OF FIBER CRIMP ON  
PENETRATION BALLISTICS OF DACRON  
AND ACRYLIC CARD\*\* BATTs; CRIMPED  
FIBERS WERE SUPERIOR TO STRAIGHT  
OR UNCRIMPED FIBERS IN  
PREVENTING PASSAGE OF FRAGMENT  
SIMULATORS.  
AD-276 256

UNCLASSIFIED

FIB-NYL

\*FIBERS(SYNTHETIC)

BODY ARMOR

EXPERIMENTAL ORGANIC FIBER  
MATERIALS FOR PERSONNEL ARMOR.  
AD-730 773

OF MEN ATTRIBUTABLE TO BODY ARMOR,  
SUN, AND WORK IN A NATURAL DESERT  
ENVIRONMENT (INCLUDING NEGRO-WHITE  
DIFFERENCES).  
AD-262 076

\*FLIGHT CREWS

BODY ARMOR

BODY ARMOR FOR AIRCREW-MEN.  
AD-688 122  
CONSTRUCTION OF BALLISTIC  
MATERIAL SAMPLES FOR AIRCREW ARMOR  
SYSTEMS.  
AD-641 737  
BALLISTIC AND SPALL TESTS FOR  
AIRCREW BODY ARMOR.  
AD-756 361

\*HELMETS

COLD WEATHER TESTS

ARCTIC ENVIRONMENTAL TEST OF  
BODY ARMOR AND HELMETS.  
AD-867 357

\*HUMAN FACTORS ENGINEERING

BODY ARMOR

HUMAN FACTORS EVALUATION OF BODY-  
SUPPORTED AIRCREWMAN'S BUTTOCKS AND  
CROTCH PROTECTIVE UNITS:  
(COMPARISONS OF TWO HEIGHTS OF  
CROTCH PROTECTOR AND THREE  
SUSPENSION SYSTEMS).  
AD-658 035

HUMAN FACTOR EVALUATION OF THE  
USMC M1955 ARMORED VEST AND THE  
PROPOSED TITANIUM NYLON IMPROVED  
CONVENTIONAL HUNITIONS PROTECTIVE  
ARMORED VEST (48 PLATE).  
AD-759 493

\*FOAMS

FLOTATION

FOAM FLOTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR.  
AD-731 000

\*MINE CLEARANCE

BODY ARMOR

A HISTORY OF THE DEVELOPMENT OF  
AN ARMOR ENSEMBLE FOR MINE  
CLEARANCE PERSONNEL.  
AD-729 353

\*NAVAL PERSONNEL

THE EFFECT OF SIMULATED TROPICAL  
CLIMATE ON THE PERFORMANCE OF  
MARINE CORPS PERSONNEL WEARING AN  
INTEGRATED BODY ARMOR-LOAD CARRYING  
SYSTEM (BALCS).  
AD-258 296

\*NYLON

BALLISTIC PROTECTIVE BUOYANT  
MATERIALS.  
AD-266 054

BALLISTIC PROTECTIVE BUOYANT  
MATERIALS.  
AD-269 577

\*HEAD(ANATOMY):

IMPACT

A STUDY OF FORCES CAUSED BY HEAD  
IMPACT ON AIRCREW PERSONNEL ARMOR  
UNDER SIMULATED CRASH CONDITIONS.  
AD-641 635

\*HEAT TOLERANCE

PHYSIOLOGICAL RESPONSE CHANGES

D-5

UNCLASSIFIED

/ZAA14

ORL-TEX

UNCLASSIFIED

BODY ARMOR

EXPERIMENTAL NYLON & FDR  
PERSONNEL ARMOR..  
AD-768 471

\*ORLON

BALLISTIC PROTECTIVE BUOYANT  
MATERIALS.  
AD-269 657  
BALLISTIC PROTECTIVE BUOYANT  
MATERIALS.  
AD-269 654  
BALLISTIC PROTECTIVE BUOYANT  
MATERIALS.  
AD-269 571

\*PATTERN RECOGNITION

SYMPOSIA

PATIENT RECOGNITION, BODY  
ARMOUR AND AIRCRAFT EQUIPMENT  
ASPECTS. CURRENT SPACE MEDICAL  
PROBLEMS. AEROMEDICAL EVACUATION..  
AD-691 392

\*PILOTS

BODY ARMOR

EVALUATION OF ARMY AIRCREW  
PROTECTIVE ARMOR IN VIETNAM..  
AD-696 451

DEVELOPMENT OF PLASTIC MATERIAL  
FOR PERSONNEL ARMOR..  
AD-669 734

\*PROTECTIVE CLOTHING

BALLISTIC PROTECTIVE BUOYANT  
MATERIALS.  
AD-269 571

\*SEA RESCUE EQUIPMENT

FEASIBILITY STUDIES

FOAM FLUTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR..  
AD-731 000

\*STRESS (PHYSIOLOGY)

THE EFFECT OF SIMULATED TROPICAL  
CLIMATE ON THE PERFORMANCE OF  
MARINE CORPS PERSONNEL WEARING AN  
INTEGRATED BODY ARMOR-LOAD CARRYING  
SYSTEM (BALCS).  
AD-258 296

\*SYMPOSIA

SYPOSIUM ON PERSONNEL ARMOR  
HELD AT THE U.S. NAVAL RESEARCH  
LABORATORY OCTOBER 4-5, 1961 VOLUME  
1.  
AD-273 826

\*SYNTHETIC FIBERS

BODY ARMOR

BICOMPONENT AND BICONSTITUENT  
FIBERS IN BALLISTIC FABRIC FOR  
PERSONNEL ARMOR..  
AD-724 918

\*TERMINAL BALLISTICS

BODY ARMOR

BALLISTIC AND SPALL TESTS FOR  
AIRCRAFT BODY ARMOR..  
AD-750 367

TEXTILES

RESEARCH ON ENERGY ABSORPTION BY  
NONWOVEN FABRICS..  
AD-737 725

\*TEST EQUIPMENT

DESIGN

DESIGN AND DEVELOPMENT OF A FULL-  
SCALE ANATOMICAL LOAD DISTRIBUTION  
ANALYZER..  
AD-758 918

\*TEXTILES

BODY ARMOR

A REVIEW OF THE DEVELOPMENT OF  
BALLISTIC NEEDLE-PUNCHED FELTS..  
AD-707 918

BICOMPONENT AND BICONSTITUENT  
FIBERS IN BALLISTIC FABRIC FOR  
PERSONNEL ARMOR..  
AD-726 918

TERMINAL BALLISTICS

RESEARCH ON ENERGY ABSORPTION BY

D-6  
UNCLASSIFIED

/ZAAJH

UNCLASSIFIED

OHL-TEX

NON-NUCLEAR FACILITIES  
AU-737 1/2

U-7  
UNCLASSIFIED /ZPA14

## UNCLASSIFIED

## TITLE INDEX

ADVANCED AIRCREW ARMOR SUSPENSION SYSTEMS.(U)	AD-713 016	*BODY ARMOR
*BODY ARMOR		
AIRCREW PROTECTIVE ARMOR.(U)	AD-826 999	*BODY ARMOR FOR AIRCREWMEN.(U)
*BODY ARMOR		*FLIGHT CREWS
ARCTIC ENVIRONMENTAL TEST OF BODY ARMOR AND HELMETS.(U)	AD-867 357	BODY ARMOR IN A HOT HUMID ENVIRONMENT. PART I. STUDIES IN UNACCLIMATIZED MEN.(U)
*HELMETS		*BODY ARMOR
ARMORED VEST, MODIFIED, EA 53-1, STUDY, EVALUATION AND FIELD TEST.(U)	AD-035 448	BODY ARMOR IN A HOT HUMID ENVIRONMENT. PART II. STUDIES IN HEAT ACCLIMATIZED MEN.(U)
*BODY ARMOR		*BODY ARMOR
BALLISTIC AND SPALL TESTS FOR AIRCREW BODY ARMOR.(U)	AD-756 367	BODY ARMOR(U)
*BODY ARMOR		*BODY ARMOR
BALLISTIC EVALUATION OF ARMORED VESTS EMPLOYING NYLON, DORON, AND MANGANESE STEEL AS ARMOR VEST, ARMOR, T52-1 VEST, ARMORED, N1951 SPOONER VEST.(U)	AD-029 020	BODY ARMOR.(U)
*BODY ARMOR		*BODY ARMOR
BALLISTIC PROTECTIVE BUOYANT MATERIALS.(U)	AD-276 256	BODY ARMOR.(U)
*BODY ARMOR		*BODY ARMOR
BALLISTIC PROTECTIVE BUOYANT MATERIALS.(U)	AD-259 057	BODY ARMOR.(U)
*ARMOR		*BODY ARMOR
BALLISTIC PROTECTIVE BUOYANT MATERIALS.(U)	AD-266 054	A COMPARATIVE BALLISTIC STUDY OF THE STANDARD U.S. ARMY VEST, N1952-A, AND OF THE CANADIAN ARMOR VEST, X53.(U)
*BODY ARMOR		*BODY ARMOR
BALLISTIC PROTECTIVE BUOYANT MATERIALS.(U)	AD-269 577	CONSTRUCTION OF BALLISTIC MATERIAL SAMPLES FOR AIRCREW ARMOR SYSTEMS.(U)
*BODY ARMOR		*BODY ARMOR
BALLISTIC TESTING OF PERSONNEL ARMOR MATERIALS.(U)	AD-719 212	CRASHWORTHINESS OF AIRCREW PROTECTIVE ARMOR.(U)
*BODY ARMOR		*CRASH INJURIES
BICOMPONENT AND HICONSTITUENT FIBERS IN BALLISTIC FABRIC FOR PERSONNEL ARMOR.(U)	AD-724 918	DESIGN AND DEVELOPMENT OF A FULL-SCALE ANATOMICAL LOAD

T-1  
UNCLASSIFIED

/ZAA14

UNCLASSIFIED

UNCLASSIFIED

DISTRIBUTION ANALYZER. (U)  
•TEST EQUIPMENT

DESIGN, DEVELOPMENT AND AD-711 876  
FABRICATION OF A PERSONNEL ARMOR  
LOAD PROTECTIVE ANALYZER. (U)  
•BODY ARMOR

THE DEVELOPMENT OF A AD-752 792  
NAVY, BUOYANT, ANTI-FRAGMENT,  
BULLETPROOF VEST: PROTECTION  
AGAINST LOW-VELLOLITY FRAGMENTS,  
SECONDARY (SPALL) FRAGMENT DAMAGE,  
AND 30-CALIBER-BALL PROJECTILES. (U)  
•BODY ARMOR

DEVELOPMENT OF PLASTIC AD-052 243  
MATERIAL FOR PERSONNEL ARMOR. (U)  
•BODY ARMOR

DEVELOPMENT OF PLASTIC AD-069 734  
MATERIAL FOR PERSONNEL ARMOR. (U)  
•BODY ARMOR

THE EFFECT OF SIMULATED AD-250 296  
TROPICAL CLIMATE ON THE PERFORMANCE  
OF MARINE CORPS PERSONNEL WEARING  
AN INTEGRATED BODY ARMOR-LOAD  
CARRYING SYSTEM (BALCS). (U)  
•BODY ARMOR

THE EFFECTS OF TWO AD-624 738  
TYPES OF BODY ARMOR ON BODY  
TEMPERATURE. (U)  
•BODY ARMOR

ENERGY COST OF WEARING AD-021 004  
ARMORED "FSIS AND CARRYING PACK  
LOADS ON TREADMILL, LEVEL COURSE,  
AND MOUNTAIN SLOPES. (U)  
•FATIGUE(PHYSIOLOGY)

ENGINEERING TEST OF AD-928 884  
LIGHTWEIGHT BODY ARMOR, BASIC VEST,  
766-1. (U)  
•BODY ARMOR

EVALUATION OF RIFLE- AD-752 903  
FIRING BEHAVIOR OF TROOPS EQUIPPED  
WITH BODY ARMOR: A PILOT STUDY. (U)  
•ARMY PERSONNEL

EVALUATION OF ARMY AD-696 481  
AIRCREW PROTECTIVE ARMOR IN  
VIETNAM. (U)

•AERIAL WARFARE

EXPERIMENTAL NYLON 6 AD-765 423  
FOR PERSONNEL ARMOR. (U)  
•BODY ARMOR

EXPERIMENTAL ORGANIC AD-730 775  
FIBER MATERIALS FOR PERSONNEL  
ARMOR. (U)

•BODY ARMOR

FOAM FLOTATION SYSTEMS AD-731 000  
FOR PERSONNEL WEARING BODY  
ARMOR. (U)

•BODY ARMOR

A HISTORY OF THE AD-729 353  
DEVELOPMENT OF AN ARMOR ENSEMBLE  
FOR MINI-CLEARANCE PERSONNEL. (U)

•BODY ARMOR

HUMAN FACTOR EVALUATION AD-759 493  
OF THE USMC M1955 ARMORED VEST AND  
THE PROPOSED TITANIUM NYLON  
IMPROVED CONVENTIONAL MUNITIONS  
PROTECTIVE ARMORED VEST (48  
PLATE). (U)

•BODY ARMOR

A HUMAN FACTORS AD-766 296  
ENGINEERING ASSESSMENT OF AN  
ANATOMICALLY CONFORMING AIRCREW  
BODY ARMOR SYSTEM. (U)

•BODY ARMOR

HUMAN FACTORS AD-658 034  
EVALUATION OF BODY-SUPPORTED  
AIRCREWMAN'S BUTTOCKS AND CROTCH  
PROTECTIVE UNITS: (COMPARISONS OF  
TWO HEIGHTS OF CROTCH PROTECTION AND  
THREE SUSPENSION SYSTEMS). (U)

•BODY ARMOR

KNIGHTS OF THE AD-719 551  
TWENTIETH CENTURY (RYTSAL)  
DVADTSATEGO YERA). (U)

•BODY ARMOR

T-2  
UNCLASSIFIED

/ZAA14

UNCLASSIFIED

PAT-WUU

PATTERN RECOGNITION. AD-691 092  
BODY ARMOUR AND AIRCREW EQUIPMENT  
ASSEMBLIES. CURRENT SPACE MEDICAL  
PROBLEMS. AEROMEDICAL  
EVALUATION.(U)  
•PATTERN RECOGNITION

PHYSIOLOGICAL COSTS OF AD-687 953  
BODY ARMOR.(U)  
•BODY ARMOR

PHYSIOLOGICAL RESPONSE AD-262 076  
CHANGES OF MEN ATTRIBUTABLE TO BODY  
ARMOR, SUN, AND WORK IN A NATURAL  
DESERT ENVIRONMENT (INCLUDING NEGRO-  
WHITE DIFFERENCES)(U)  
•BODY ARMOR

RESEARCH ON ENERGY AD-737 725  
ABSORPTION BY NONWOVEN FABRICS.(U)  
•TEXTILES

A REVIEW OF THE AD-707 918  
DEVELOPMENT OF BALLISTIC NEEDLE-  
PUNCHED FELTS.(U)  
•TEXTILES

SERVICE TEST OF AD-818 141  
LIGHTWEIGHT BODY ARMOR, BASIC VEST,  
766-1.(U)  
•BODY ARMOR

A SET OF ANGLES OF AD-255 237  
OBLIQUITY FOR USE IN ASSESSING BODY  
ARMOR(U)  
•BODY ARMOR

SOME EFFECTS OF BODY AD-753 937  
ARMOR ON MOTOR PERFORMANCE. PART  
I. EFFECTS OF STANDARD (135 PLATE)  
AND EXPERIMENTAL (140 PLATE)  
TITANIUM-NYLON BODY ARMOR ON MOTOR  
PERFORMANCE. PART II. ARMOR AND  
LOAD INDUCED PATTERNS OF PRESSURE  
ON THE TORSO DURING MOTOR  
PERFORMANCE.(U)  
•BODY ARMOR

A STUDY OF FELTS FOR AD-695 644  
PERSONAL ARMOR.(U)  
•BODY ARMOR

A STUDY OF FORCES AD-685 838  
CAUSED BY HEAD IMPACT ON AIRCREW  
PERSONNEL ARMOR UNDER SIMULATED  
CRASH CONDITIONS.(U)  
•AVIATION ACCIDENTS

SYMPONIUM ON PERSONNEL AD-273 876  
ARMOR HELD AT THE U. S. NAVAL  
RESEARCH LABORATORY OCTOBER 4-5,  
1961 VOLUME I(U)

•BODY ARMOR

A SYSTEMS EFFECT STUDY AD-763 165  
ON THE EVALUATION OF LIGHTWEIGHT  
BODY ARMOR.(U)

•BODY ARMOR

WOUND BALLISTICS. AD-029 480  
WOUNDED IN ACTION, KOREA: 6 AUGUST  
1953-19 AUGUST 1953(U)

•BALLISTICS

UNCLASSIFIED

PERSONAL AUTHOR INDEX

\*ALESI, ANTHONY L.  
\*\*\*  
BODY ARMOR FOR AIRCREWMEN.  
AD-688 122

\*BARRON, E. R.  
\*\*\*  
DESIGN, DEVELOPMENT AND FABRICATION  
OF A PERSONNEL ARMOR LOAD PROFILE  
ANALYZER.  
AD-711 876

\* \* \*  
DESIGN AND DEVELOPMENT OF A FULL-  
SCALE ANATOMICAL LOAD DISTRIBUTION  
ANALYZER.  
AD-758 918

\*BARRON, EDWARD R.  
\*\*\*  
A STUDY OF FORCES CAUSED BY HEAD  
IMPACT ON AIRCREW PERSONNEL ARMOR  
UNDER SIMULATED CRASH CONDITIONS.  
AD-685 838

\* \* \*  
BODY ARMOR FOR AIRCREWMEN.  
AD-688 122

\* \* \*  
EVALUATION OR ARMY AIRCREW  
PROTECTIVE ARMOR IN VIETNAM.  
AD-696 481

\*BLYTH, C.S.  
\*\*\*  
THE EFFECT OF SIMULATED TROPICAL  
CLIMATE ON THE PERFORMANCE OF  
MARINE CORPS PERSONNEL WEARING AN  
INTEGRATED BODY ARMOR-LOAD CARRYING  
SYSTEM (BALCS)  
AD-258 296

\*BRICE, G. H.  
\*\*\*  
BICOMPONENT AND BICONSTITUENT  
FIBERS IN BALLISTIC FABRIC FOR  
PERSONNEL ARMOR.  
AD-726 918

\*BRYANT, JAMES A.  
\*\*\*  
SERVICE TEST OF LIGHTWEIGHT BODY  
ARMOR, BASIC VEST, T66-1.

AD-818 141

\*BURNS, M.  
\*\*\*  
CONSTRUCTION OF BALLISTIC MATERIAL  
SAMPLES FOR AIRCREW ARMOR SYSTEMS.  
AD-691 739

\* \* \*  
DESIGN, DEVELOPMENT AND FABRICATION  
OF A PERSONNEL ARMOR LOAD PROFILE  
ANALYZER.  
AD-711 876

\* \* \*  
DESIGN AND DEVELOPMENT OF A FULL-  
SCALE ANATOMICAL LOAD DISTRIBUTION  
ANALYZER.  
AD-758 918

\*BURNS, MARVIN  
\*\*\*  
ADVANCED AIRCREW ARMOR SUSPENSION  
SYSTEMS.  
AD-713 016

\*BURSE, RICHARD L.  
\*\*\*  
HUMAN FACTORS EVALUATION OF BODY-  
SUPPORTED AIRCREWMAN'S BUTTOCKS AND  
CROTCH PROTECTIVE UNITS:  
(COMPARISONS OF TWO HEIGHTS OF  
CROTCH PROTECTOR AND THREE  
SUSPENSION SYSTEMS).  
AD-658 034

\* \* \*  
EVALUATION OR ARMY AIRCREW  
PROTECTIVE ARMOR IN VIETNAM.  
AD-696 481

\*BUTTKUS, PAUL J.  
\*\*\*  
BALLISTIC AND SPALL TESTS FOR  
AIRCREW BODY ARMOR.  
AD-756 367

\*CHANDLER, WALLACE  
\*\*\*  
A SET OF ANGLES OF OBLIQUITY FOR  
USE IN ASSESSING BODY ARMOR  
AD-255 237

\*COE, GEORGE B

P-1  
UNCLASSIFIED

/ZAAI4

UNCLASSIFIED

COO-GO

WOUND BALLISTICS: WOUNDED IN ACTION, KOREA, 6 AUGUST 1953-19 AUGUST 1953  
AD-029 480

\*COOK, E.B.

THE EFFECT OF SIMULATED TROPICAL CLIMATE ON THE PERFORMANCE OF MARINE CORPS PERSONNEL WEARING AN INTEGRATED BODY ARMOR-LOAD CARRYING SYSTEM (BALCS)  
AD-258 296

\*CORONA, BERNARD M.

EVALUATION OF RIFLE-FIRING BEHAVIOR OF TROOPS EQUIPPED WITH BODY ARMOR: A PILOT STUDY.  
AD-752 903

HUMAN FACTOR EVALUATION OF THE USMC M1955 ARMORED VEST AND THE PROPOSED TITANIUM NYLON IMPROVED CONVENTIONAL MUNITIONS PROTECTIVE ARMORED VEST (48 PLATE).  
AD-759 493

A HUMAN FACTORS ENGINEERING ASSESSMENT OF AN ANATOMICALLY CONFORMING AIRCREW BODY ARMOR SYSTEM.  
AD-766 296

\*CRONAU, LESLIE H., JR

BODY ARMOR IN A HOT HUMID ENVIRONMENT. PART I. STUDIES IN UNACCLIMATIZED MEN.  
AD-676 689

\*DANIELS, FARRINGTON JR

ENERGY COST OF WEARING ARMORED VESTS AND CARRYING PACK LOADS ON TREADMILL, LEVEL COURSE, AND MOUNTAIN SLOPES  
AD-021 004

\*DECARLO, GERALD

A SET OF ANGLES OF OBLIQUITY FOR USE IN ASSESSING BODY ARMOR  
AD-255 237

\*ELLIS, PAUL H.

EVALUATION OF RIFLE-FIRING BEHAVIOR OF TROOPS EQUIPPED WITH BODY ARMOR: A PILOT STUDY.  
AD-752 903

HUMAN FACTOR EVALUATION OF THE USMC M1955 ARMORED VEST AND THE PROPOSED TITANIUM NYLON IMPROVED CONVENTIONAL MUNITIONS PROTECTIVE ARMORED VEST (48 PLATE).  
AD-759 493

\*GATLIN, CLIFFORD I.

CRASHWORTHINESS OF AIRCREW PROTECTIVE ARMOR.  
AD-672 504

A STUDY OF FORCES CAUSED BY HEAD IMPACT ON AIRCREW PERSONNEL ARMOR UNDER SIMULATED CRASH CONDITIONS.  
AD-685 838

\*GOLDMAN, RALPH F.

BODY ARMOR IN A HOT HUMID ENVIRONMENT. PART I. STUDIES IN UNACCLIMATIZED MEN.  
AD-676 689

BODY ARMOR IN A HOT HUMID ENVIRONMENT. PART II. STUDIES IN HEAT ACCLIMATIZED MEN.  
AD-682 689

PHYSIOLOGICAL COSTS OF BODY ARMOR.  
AD-687 953

\*GOSWAMI, B. C.

A STUDY OF FELTS FOR PERSONAL ARMOR.  
AD-695 644

UNCLASSIFIED

HAL-LIL

\*HALEY, JOSEPH L., JR  
\* \* \*  
CRASHWORTHINESS OF AIRCREW  
PROTECTIVE ARMOR.  
AD-672 504

\*HANSON, HAROLD E  
\* \* \*  
PHYSIOLOGICAL RESPONSE CHANGES OF  
MEN ATTRIBUTABLE TO BODY ARMOR,  
SUN, AND WORK IN A NATURAL DESERT  
ENVIRONMENT (INCLUDING NEGRO-WHITE  
DIFFERENCES)  
AD-262 076

\*HEARLE, J. W. S.  
\* \* \*  
RESEARCH ON ENERGY ABSORPTION BY  
NONWOVEN FABRICS.  
AD-737 725

\*HENRY, MALCOLM C.  
\* \* \*  
A REVIEW OF THE DEVELOPMENT OF  
BALLISTIC NEEDLE-PUNCHED FELTS.  
AD-707 918

\*JASKOWSKI, M.C.  
\* \* \*  
BALLISTIC PROTECTIVE BUOYANT  
MATERIALS  
AD-259 057

\*BALLISTIC PROTECTIVE BUOYANT  
MATERIALS  
AD-266 054

\*BALLISTIC PROTECTIVE BUOYANT  
MATERIALS  
AD-269 577

\*JASKOWSKI, MICHAEL C  
\* \* \*  
BALLISTIC PROTECTIVE BOUYANT  
MATERIALS  
AD-276 256

\*JEFFERSON, R. T.  
\* \* \*  
FOAM FLOTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR.

AD-731 000

\*JONES, R. DOUGLAS  
\* \* \*  
EVALUATION OF RIFLE-FIRING BEHAVIOR  
OF TROOPS EQUIPPED WITH BODY ARMOR:  
A PILOT STUDY.  
AD-752 903

HUMAN FACTOR EVALUATION OF THE USMC  
M1955 ARMORED VEST AND THE PROPOSED  
TITANIUM NYLON IMPROVED  
CONVENTIONAL MUNITIONS PROTECTIVE  
ARMORED VEST (48 PLATE).  
AD-759 493

\* \* \*  
A HUMAN FACTORS ENGINEERING  
ASSESSMENT OF AN ANATOMICALLY  
CONFORMING AIRCREW BODY ARMOR  
SYSTEM.  
AD-766 296

\*JUDGE, THOMAS H.  
\* \* \*  
BALLISTIC AND SPALL TESTS FOR  
AIRCREW BODY ARMOR.  
AD-756 367

\*LAIBLE, ROY C.  
\* \* \*  
A REVIEW OF THE DEVELOPMENT OF  
BALLISTIC NEEDLE-PUNCHED FELTS.  
AU-707 918

\*LAMBER, C. F.  
\* \* \*  
CONSTRUCTION OF BALLISTIC MATERIAL  
SAMPLES FOR AIRCREW ARMOR SYSTEMS.  
AD-691 739

\*LASTNIK, ABRAHAM L.  
\* \* \*  
A HISTORY OF THE DEVELOPMENT OF AN  
ARMOR ENSEMBLE FOR MINE CLEARANCE  
PERSONNEL.  
AD-729 353

\*LILYQUIST, MARVIN R.  
\* \* \*  
EXPERIMENTAL ORGANIC FIBER  
MATERIALS FOR PERSONNEL ARMOR.

P-3  
UNCLASSIFIED

/ZAAI4

## UNCLASSIFIED

LIT-PUR

AD-730 775

\*LITT, B. D.

BODY ARMOR IN A HOT HUMID ENVIRONMENT. PART II. STUDIES IN HEAT ACCLIMATIZED MEN.  
AD-632 689

\*LYONS, W. JAMES

A STUDY OF FELTS FOR PERSONAL ARMOR.  
AD-695 644

\*MAHEUX, R.C.

A COMPARATIVE BALLISTIC STUDY OF THE STANDARD U.S. ARMY VEST, M1952-A, AND OF THE CANADIAN ARMOR VEST, X53  
AD-039 470

\*MAISEL, HERBERT

A SET OF ANGLES OF OBLIQUITY FOR USE IN ASSESSING BODY ARMOR  
AD-255 237

\*MANGUM, EDWIN W.

ENGINEERING TEST OF LIGHTWEIGHT BODY ARMOR, BASIC VEST, T66-1.  
AD-828 884

\*MARTORANO, J.J.

THE EFFECT OF SIMULATED TROPICAL CLIMATE ON THE PERFORMANCE OF MARINE CORPS PERSONNEL WEARING AN INTEGRATED BODY ARMOR-LOAD CARRYING SYSTEM (BALCS)  
AD-258 296

\*MASCIANICA, F.S.

BALLISTIC EVALUATION OF ARMORED VESTS EMPLOYING NYLON, DORON, AND MANGANESE STEEL AS ARMOR VEST, ARMOR, T52-1 VEST, ARMORED, M1951 SPOONER VEST

AD-029 020

\*MAYER, RICHARD E.

EXPERIMENTAL NYLON 6 FOR PERSONNEL ARMOR.  
AD-765 423

\*MCGINNIS, JOHN M.

EVALUATION OF ARMY AIRCREW PROTECTIVE ARMOR IN VIETNAM.  
AD-696 481

SOME EFFECTS OF BODY ARMOR ON MOTOR PERFORMANCE. PART I. EFFECTS OF STANDARD (135 PLATE) AND EXPERIMENTAL (48 PLATE) TITANIUM-NYLON BODY ARMOR ON MOTOR PERFORMANCE. PART II. ARMOR AND LOAD INDUCED PATTERNS OF PRESSURE ON THE TORSO DURING MOTOR PERFORMANCE.  
AD-753 937

\*NORTON, ROBERT J.

THE EFFECTS OF TWO TYPES OF BODY ARMOR ON BODY TEMPERATURE.  
AD-624 738

\*OGDEN, C.

DESIGN AND DEVELOPMENT OF A FULL-SCALE ANATOMICAL LOAD DISTRIBUTION ANALYZER.  
AD-758 918

\*OLSON, M. W.

BICOMPONENT AND BICONSTITUENT FIBERS IN BALLISTIC FABRIC FOR PERSONNEL ARMOR.  
AD-726 918

\*PARK, ALICE F.

BODY ARMOR FOR AIRCREWMEN.  
AD-688 122

\*PURDY, A. T.

P-4

UNCLASSIFIED

/ZAAI4

UNCLASSIFIED

RAN-SCR

\* \* \*  
RESEARCH ON ENERGY ABSORPTION BY  
NONWOVEN FABRICS.  
AD-737 725

\*RANDALL, R. BRADLEY

\* \* \*  
EVALUATION OF RIFLE-FIRING BEHAVIOR  
OF TROOPS EQUIPPED WITH BODY ARMOR:  
A PILOT STUDY.  
AD-752 903

\* \* \*  
HUMAN FACTOR EVALUATION OF THE USMC  
M1955 ARMORED VEST AND THE PROPOSED  
TITANIUM NYLON IMPROVED  
CONVENTIONAL MUNITIONS PROTECTIVE  
ARMORED VEST (48 PLATE).  
AD-759 493

\*RASCH, PHILIP J.

\* \* \*  
THE EFFECTS OF TWO TYPES OF BODY  
ARMOR ON BODY TEMPERATURE.  
AD-624 738

\*REINS, DALE A.

\* \* \*  
THE DEVELOPMENT OF A NAVY, BUOYANT,  
ANTI-FRAGMENT, BULLETPROOF VEST;  
PROTECTION AGAINST LOW-VELOCITY  
FRAGMENTS, SECONDARY (SPALL)  
FRAGMENT DAMAGE, AND 30-CALIBER-  
BALL PROJECTILES.  
AD-752 792

\*RODZEN, R.

\* \* \*  
DESIGN AND DEVELOPMENT OF / FULL-  
SCALE ANATOMICAL LOAD DISTRIBUTION  
ANALYZER.  
AD-758 918

\*RODZEN, R. A.

\* \* \*  
CONSTRUCTION OF BALLISTIC MATERIAL  
SAMPLES FOR AIRCREW ARMOR SYSTEMS.  
AD-691 739

\*SACCO, WILLIAM J.

\* \* \*  
A SYSTEMS EFFECT STUDY ON THE

EVALUATION OF LIGHTWEIGHT BODY  
ARMOR.  
AD-763 165

\*SALYER, I. O.

\* \* \*  
FOAM FLOTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR.  
AD-731 000

\*SCARDINO, FRANK L.

\* \* \*  
A STUDY OF FELTS FOR PERSONAL  
ARMOR.  
AD-695 644

\*SCHAMADAN, JAMES L.

\* \* \*  
CRASHWORTHINESS OF AIRCREW  
PROTECTIVE ARMOR.  
AD-672 504

\* \* \*  
A STUDY OF FORCES CAUSED BY HEAD  
IMPACT ON AIRCREW PERSONNEL ARMOR  
UNDER SIMULATED CRASH CONDITIONS.  
AD-685 838

\*SCHEETZ, HAYDEN A.

\* \* \*  
EVALUATION OF RIFLE-FIRING BEHAVIOR  
OF TROOPS EQUIPPED WITH BODY ARMOR:  
A PILOT STUDY.  
AD-752 903

\* \* \*  
HUMAN FACTOR EVALUATION OF THE USMC  
M1955 ARMORED VEST AND THE PROPOSED  
TITANIUM NYLON IMPROVED  
CONVENTIONAL MUNITIONS PROTECTIVE  
ARMORED VEST (48 PLATE).  
AD-759 493

\*SCHWENDEMAN, J. L.

\* \* \*  
FOAM FLOTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR.  
AD-731 000

\*SCRIBANO, F.

\* \* \*  
DESIGN, DEVELOPMENT AND FABRICATION  
OF A PERSONNEL ARMOR LOAD PROFILE

P-5  
UNCLASSIFIED

/ZAAI4

## UNCLASSIFIED

CR-WIN

ANALYZER.  
AD-711 876

\* \* \*

DESIGN AND DEVELOPMENT OF A FULL-  
SCALE ANATOMICAL LOAD DISTRIBUTION  
ANALYZER.  
AD-758 918

\*SCRIBANO, F. C.

\* \* \*

CONSTRUCTION OF BALLISTIC MATERIAL  
SAMPLES FOR AIRCREW ARMOR SYSTEMS.  
AD-691 739

\*SCRIBANO, FRANK C.

\* \* \*

ADVANCED AIRCREW ARMOR SUSPENSION  
SYSTEMS.  
AD-713 016

\*SHAMPINE, JAMES C.

\* \* \*

THE DEVELOPMENT OF A NAVY, BUOYANT,  
ANTI-FRAGMENT, BULLETPROOF VEST:  
PROTECTION AGAINST LOW-VELOCITY  
FRAGMENTS, SECONDARY (SPALL)  
FRAGMENT DAMAGE, AND 30-CALIBER-  
BALL PROJECTILES.  
AD-752 792

\*SHEAR, RALPH E.

\* \* \*

A SYSTEMS EFFECT STUDY ON THE  
EVALUATION OF LIGHTWEIGHT BODY  
ARMOR.  
AD-763 165

\*SILVIA, JOHN

\* \* \*

THE DEVELOPMENT OF A NAVY, BUOYANT,  
ANTI-FRAGMENT, BULLETPROOF VEST:  
PROTECTION AGAINST LOW-VELOCITY  
FRAGMENTS, SECONDARY (SPALL)  
FRAGMENT DAMAGE, AND 30-CALIBER-  
BALL PROJECTILES.  
AD-752 792

\*SFICELY, SAMUEL B.

\* \* \*

BODY ARMOR.  
AD-815 561

\*STEWART, GEORGE M

\* \* \*

A COMPARATIVE BALLISTIC STUDY OF  
THE STANDARD U.S. ARMY VEST, M1952-  
A, AND OF THE CANADIAN ARMOR VEST,  
X53  
AD-039 470

\*SUN, S. M.

\* \* \*

FCAM FLOTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR.  
AD-731 000

\*TANENHOLTZ, STANLEY D.

\* \* \*

A STUDY OF FORCES CAUSED BY HEAD  
IMPACT ON AIRCREW PERSONNEL ARMOR  
UNDER SIMULATED CRASH CONDITIONS.  
AD-685 838

\*TURNBOW, JAMES W.

\* \* \*

CRASHWORTHINESS OF AIRCREW  
PROTECTIVE ARMOR.  
AD-672 504

\*VANDERBIE, JAN H

\* \* \*

ENERGY COST OF WEARING ARMORED  
VESTS AND CARRYING PACK LOADS ON  
TREADMILL, LEVEL COURSE, AND  
MOUNTAIN SLOPES  
AD-021 004

\*WHITE, PAUL C., JR

\* \* \*

THE EFFECTS OF TWO TYPES OF BODY  
ARMOR ON BODY TEMPERATURE.  
AD-624 738

\*WINSMANN, FRED R

\* \* \*

ENERGY COST OF WEARING ARMORED

UNCLASSIFIED

WOJ-ZHO

VESTS AND CARRYING PACK LOADS ON  
TREADMILL, LEVEL COURSE, AND  
MOUNTAIN SLOPES  
AD-021 004

\*WOJTOWICZ, A.

\* \* \*

FOAM FLOTATION SYSTEMS FOR  
PERSONNEL WEARING BODY ARMOR.  
AD-731 000

\*YARGER, WILLIAM E.

\* \* \*

BODY ARMOR IN A HOT HUMID  
ENVIRONMENT. PART I. STUDIES IN  
UNACCLIMATIZED MEN.  
AD-676 689

\* \* \*

BODY ARMOR IN A HOT HUMID  
ENVIRONMENT. PART II. STUDIES IN  
HEAT ACCLIMATIZED MEN.  
AD-682 689

\*YOST, DEVERNE R.

\* \* \*

AIRCREW PROTECTIVE ARMOR.  
AD-626 999

\*YOUNG, D.A

\* \* \*

DEVELOPMENT OF PLASTIC MATERIAL FOR  
PERSONNEL ARMOR  
AD-052 243

\* \* \*

DEVELOPMENT OF PLASTIC MATERIAL FOR  
PERSONNEL ARMOR  
AD-069 734

\*ZHOLONDKOVSKII, O.

\* \* \*

KNIGHTS OF THE TWENTIETH CENTURY  
(RYTSALI DVADTSATEGO Veka),  
AD-719 551

P-7

UNCLASSIFIED

/ZAAI4

## UNCLASSIFIED

## CONTRACT INDEX

\*DA-19-129-AMC-641(N)  
IIT RESEARCH INST CHICAGO ILL  
(USA-NLA85-TR-69-51-CE)  
AD-691 734

\*DAAG17-67-C-0138  
AVIATION SAFETY ENGINEERING AND  
RESEARCH FACILITY LAFAYETTE LA 7132  
(USA-NLA85-TR-68-57-CE)  
AD-672 504

DYNAMIC SCIENCE PHOENIX ARIZ 85001  
FACILITY  
(USA-NLA85-TR-69-49-CE)  
AD-692 638

\*DAAG17-68-C-0029  
IIT RESEARCH INST CHICAGO ILL  
(USA-NLA85-TR-70-51-CE)  
F AD-713 016

\*DAAG17-68-C0040  
TEXTILE RESEARCH INST PRINCETON NJ  
(USA-NLA85-TR-70-13-CE)  
AD-694 644

\*DAAG17-69-C-0003  
IIT RESEARCH INST CHICAGO ILL  
(USA-NLA85-TR-70-65-CE)  
F AD-711 876

\*DAAG17-69-C-0017  
MONSANTO RESEARCH CORP DAYTON OHIO  
(USA-NLA85-TR-72-3-CE)  
F AD-731 010

\*DAAG17-69-C0079  
MONSANTO RESEARCH CORP DURHAM NC  
(USA-NLA85-TR-71-47-CE)  
AD-730 775

\*DAAG17-70-C-0029  
ALLIED CHEMICAL CORP PETERSBURG VA  
(USA-NLA85-TR-73-2-CE)  
F AD-765 423

\*DAAG17-70-C-0032  
UNIROYAL INC WAYNE NJ  
(USA-NLA85-TR-71-48-CE)  
AD-725 916

\*DAAG17-70-C-0161  
IIT RESEARCH INST CHICAGO ILL  
F AD-758 916

\*DAI28 0179RDP1472  
AEROJET-GENERAL CORP AZUSA CALIF  
AD-U52 243  
AD-U69 734

\*DAJA37-71-C-0554  
UNIVERSITY OF MANCHESTER INST OF  
SCIENCE AND TECHNOLOGY (ENGLAND)  
F AD-737 725

\*N140 138 68879  
MELLON INST PITTSBURGH PA  
AD-259 057  
AD-266 054  
AD-269 577  
AD-276 256

## UNCLASSIFIED

## REPORT NUMBER INDEX

2-72 AD-752 79.	MTP-10-4-009 AD-867 357
AGARD-CP-41 AD-691 092	RR257 AD-029 480
C/ED-50 AD-688 122	RR300 AD-039 470
C/PLSEL-84 AD-729 353	T 1041 AD-037 068
C/PLSEL-98 AD-756 367	T 1041 1 AD-035 448
C/PSEL-99 AD-758 918	TOP-10-3-022 AD-751 155
C/PSEL-T 167 AD-707 918	TR-105 AD-752 792
EA-TR-4729 AD-763 165	USA-NLABS-72-3-CE AD-731 000
EPB-208 AD-021 004	USA-NLABS-TR-68-4-PR AD-658 034
EPR-14 AD-658 034	USA-NLABS-TR-68-57-CM AD-672 504
EPT-9 AD-696 481	USA-NLABS-TR-69-43-CE AD-688 122
FSTC-HT-23-1051-70 AD-719 551	USA-NLABS-TR-69-49-CE AD-685 038
HEL-TM-8-73 AD-759 493	USA-NLABS-TR-69-61-CE AD-691 739
HEL-TM-9-73 AD-766 296	USA-NLABS-TR-69-79-PR AD-696 481
HEL-TN-14-72 AD-752 903	USA-NLABS-TR-70-13-CE AD-695 644
MTP-10-2-206 AD-872 651	USA-NLABS-TR-70-32-CE AD-707 918
MTP-10-2-506 AD-719 212	USA-NLABS-TR-70-51-CE AD-713 016

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USA-NLABS-TR-70-65-CE  
AD-711 876

USA-NLABS-TR-71-30-CE  
AD-729 353

USA-NLABS-TR-71-47-CE  
AD-730 775

USA-NLABS-TR-71-48-CE  
AD-736 148

USA-NLABS-TR-73-9-CE  
AD-756 367

USA-NLABS-TR-73-13-PR  
AD-753 937

USA-NLABS-TR-73-28-CE  
AD-765 423

USAIB-3174  
AD-818 141

WAL-710/1014  
AD-029 020

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